FACTORY

BETTER PRODUCTION AND MAINTENANCE THROUGH BETTER MANAGEMENT

Watercolor painting: Sun drenches Hewlett-Packard Company's new plant in an industrial park, Palo Alto, Calif.

AUGUST 1959

PRICE ONE DOLLAR

A McGRAW-HILL PUBLICATION

WORK MEASUREMENT . . . . . p. 60

How it started, where it stands today, what's ahead

HOW TO GET YOUR BEST PLANT LAYOUT . . . . . p. 68

BILLION-DOLLAR PAINT THIEF . . . . . p. 140

Industry Standard for Lower Maintenance Costs

LQ600®

Here's Why: Long accepted valve maintenance costs are a thing of the past in thousands of plants where LQ600's have been installed . . . even in the most severe services where previous valves required repair or replacement after as little as two weeks on the line.

These outstanding savings are made possible by seats and discs of Brinalloy®, a patented Lunkenheimer alloy that is more resistant to wear and corrosion than 500 Brinell Stainless or 1000 Brinell Case-Hardened Stainless Steel.

Add to this the Lunkenheimer exclusive silicon-bronze Stemalloy®, the most durable stem material ever put into a valve, and you have two important reasons why LQ600's have established new low-maintenance standards everywhere they are installed.

For an actual comparison test, call the Lunkenheimer Distributor in your area. He is an expert on valve maintenance costs and will be glad to demonstrate the maintenance-saving benefits you receive when you install LQ600's . . . or write The Lunkenheimer Company, Cincinnati 14, Ohio

LQ600-150 150 lb. S.P., 300 lb. W.O.G.

LQ600-200 200 lb. S.P. 550°F., 400 lb., W.O.G.

LUNKENHEIMER QUALITY

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES

For more facts circle 446 on READER SERVICE CARD

B.F.Goodrich

Koroseal goes around with a drip no other belt can stand

A typical example of B.F.Goodrich product improvement

THE chemical coating sprayed inside those fluorescent tubes costs too much to waste a drop. A conveying system was installed to catch the drippings and carry them to a tank for reuse. But no ordinary conveyor belt could handle the job. This strong chemical would soak into the belt, soften the cover, rot the fabric. When a B.F.Goodrich distributor heard of the problem, he suggested a belt made of Koroseal flexible material.

This B.F.Goodrich belt defies the stuff that ruins other belts—chemicals, grease, most acids, vegetable, animal or mineral oils, alkalies. The Koroseal cover is tough, resists abrasion, cracking, peeling, never gets soft or sticky. Its smooth, nonporous surface is easy to clean. And it can be vulcanized into a continuous belt, eliminating troublesome fasteners, the weak spot in most belts.

A Koroseal belt was installed as a moving drip pan under the fluorescent tubes. That was 2½ years ago. It worked so successfully that today in this plant there are eight conveying systems of this type, using B.F.Goodrich Koroseal belts.

Your B.F.Goodrich distributor has the exact specifications for the Koroseal belt described here. And as a factory-trained specialist in rubber products, he can answer your questions about the many products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-638, Akron 18, O.*

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THE MAGAZINE OF PLANT OPERATING MANAGEMENT

Edited exclusively for the men with management responsibility for production and maintenance in the manufacturing industries

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THIS SIMPLE FILING SYSTEM is designed to give quick access to past FACTORY articles that can help you solve current operating problems. Here's how it works:

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For ways to use this tool, plus an outline for a complete decimal filing system, check square at top of Reader Service Card, next to back cover.

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ELPAR'S New TITAN

. . . first BIG TRUCK with small truck maneuverability

No other truck in the 12,000 to 20,000 lb. capacity range can match the new TITAN for maneuverability. Built to operate through box car doors, the TITAN is ideal for car loading and for handling in narrow or congested aisles.

Other important features include:

TRI-SAFE BRAKING—an ELPAR safety exclusive that provides three independent braking systems operated by a single toe bar.

FASTER SPEEDS — fast lift and travel speeds plus rapid acceleration mean greater working efficiency.

UNEXCELLED VISION—elimination of bulky linkage gives the operator a clear view between the uprights.

As easy to operate as the family car, the new TITAN is the product of ELPAR's more than 50 years of industrial truck building experience. Compare features and you'll be convinced the TITAN is the best heavy duty fork truck buy!

5 models — 12,000 to 20,000 lbs. capacity

Send for this new TITAN folder —

ELPAR

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In Canada: International Equipment Company, Ltd.

TWICE THE LIFE . . . ONE-THIRD THE OPERATING COST

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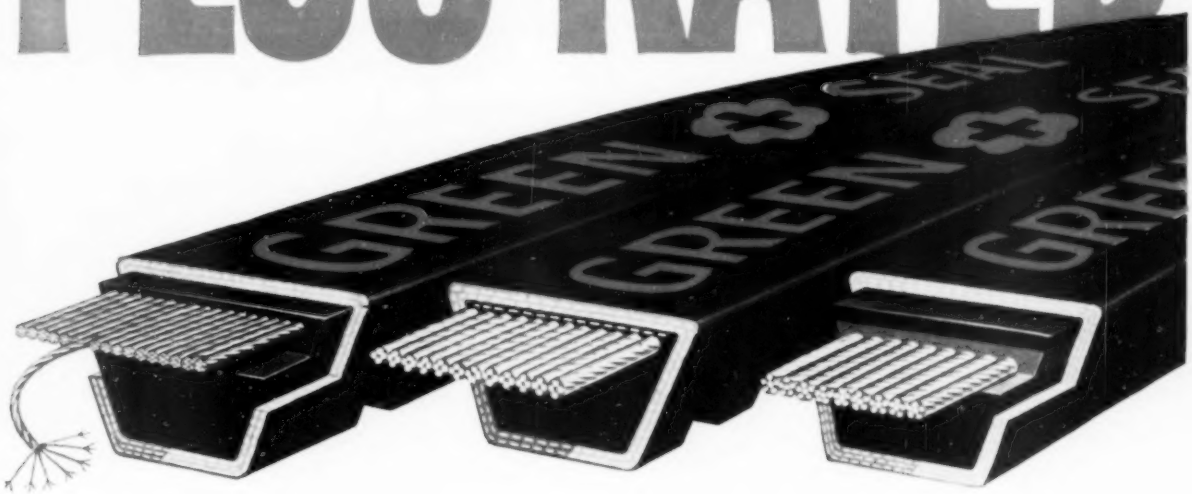
Now they're "PLUS-RATED"



That's right!! All V-Belts with the Green Seal are now "PLUS-RATED."

"PLUS-RATED" means the horsepower carrying capacities of previously standard E-C Cord V-Belts, super-rated Hy-T V-Belts and top-rated Compass-V Steel Belts have all been substantially increased to give you the maximum in rated horsepower hours per dollar.

Example: E-C Cord V-Belts are now rated at a 40% higher horsepower capacity than ever before.

And Remember These Important Facts:

1. The "PLUS" ratings are offered in addition to dimensional stability and the many other plus properties of V-Belts with the Green Seal at no extra cost.

2. The "PLUS" ratings have been established only after a careful study of the actual performance of thousands of sets of Green Seal Belts.

The full story on why and how all V-Belts with the Green Seal have been "PLUS-RATED" goes back to their introduction in May 1957, and is too long to detail here. See your Goodyear Dealer for all the performance-proved facts and figures. Or write Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

"PLUS-RATED" V-BELTS
WITH THE GREEN SEAL BY

GOODYEAR

THE GREATEST NAME IN RUBBER

Green Seal, E-C Cord, Hy-T, Compass—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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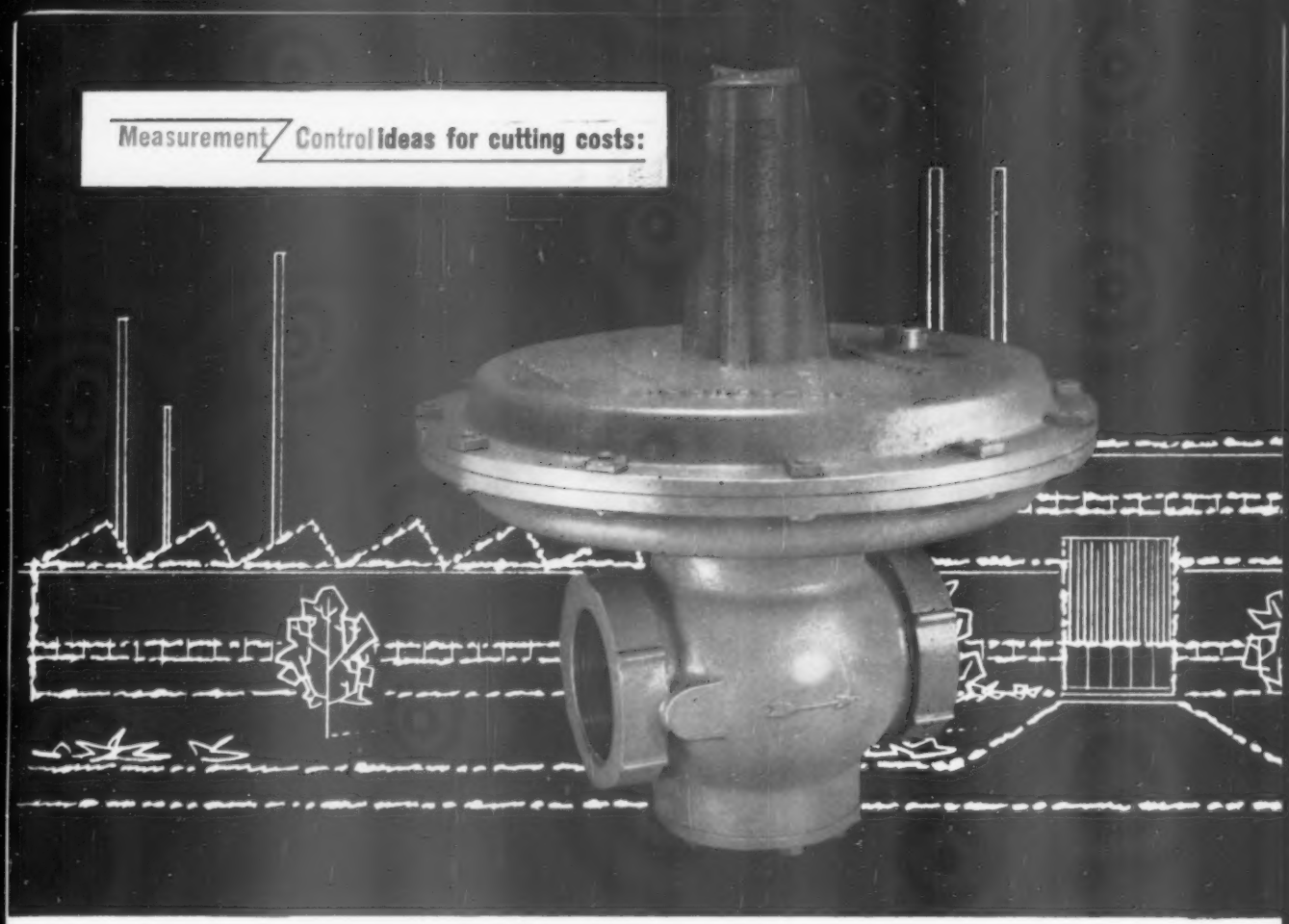

The $40.00 regulator that could have saved $30,000.00

A gas pressure regulator like the one shown above was doing a precise job of regulating fuel gas in a glass plant—until a scaffold fell on it. Without the regulator, the entire plant was out of business. Down-time cost was about $30,000.00.

The Rockwell Field Engineer who personally rushed another regulator to this customer pointed out that an extra stand-by regulator would cost only $40.00—low-cost insurance against a possible $30,000.00 loss. The customer followed this recommendation, as well as others which the Field Engineer made in the interest of more efficient handling of measurement and control functions in this plant.

There are many ways a Rockwell Field Engineer can help *you* save time, money, and material wherever gases or liquids flow through pipe in your plant. He represents the largest and most experienced manufacturer of measurement and control products—and this experience can pay off for you. New or different uses of valves or regulators can prevent waste and inefficiency. Rockwell gas and liquid meters can measure almost anything that flows through a pipe, and can often assure big savings in time and labor, while improving quality.

It costs nothing to talk to a Rockwell Field Engineer—simply send the coupon.

ROCKWELL

The leading single source for Measurement / Control products and ideas

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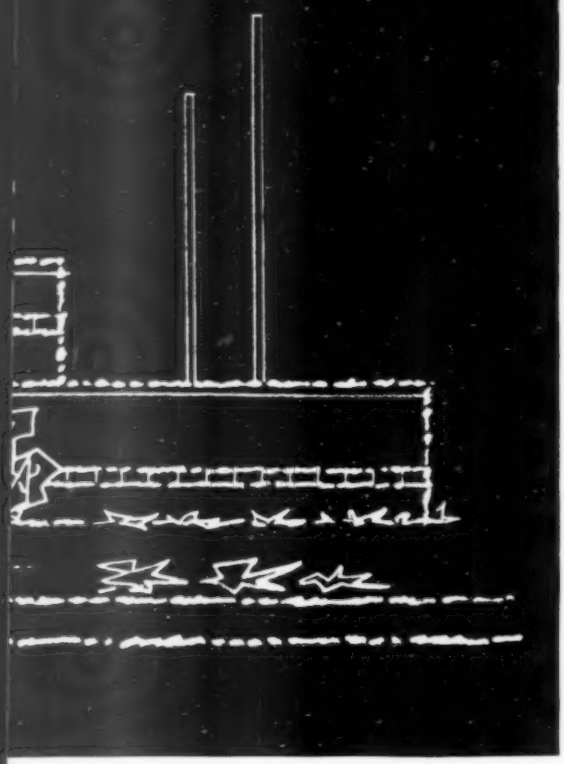
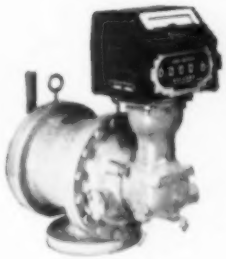


"IN-PLANT" METERING:

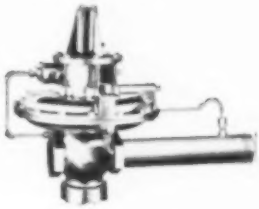
LIQUIDS AND GASES

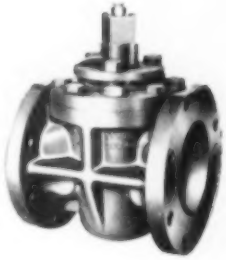


"IN-PLANT" METERING can mean new cost cutting opportunities. Accurate liquid and gas meters are a positive way of improving cost control, insuring better use of materials, sharpening inventory control, and preventing waste. Whatever the need, Rockwell has the right liquid or gas meter to do the job better and at lower cost.

CONTROLLING PIPED MATERIAL:

LIQUIDS AND GASES





CONTROLLING PIPED MATERIAL more efficiently is a positive step towards cost cutting. Better valves can save wasted products and materials and often increase plant safety. Gas pressure regulators can cut costs by assuring safe, economical use of any gas used in the plant. Rockwell has the world's most complete line of flow control devices.

HOW MUCH COULD YOU SAVE?

There is hardly a plant of any kind—including yours—where the right application of the right measurement and control methods and equipment won't produce savings many times the modest cost involved. It will cost you nothing to have a Rockwell Field Engineer *show* you. Simply send the coupon below, now.

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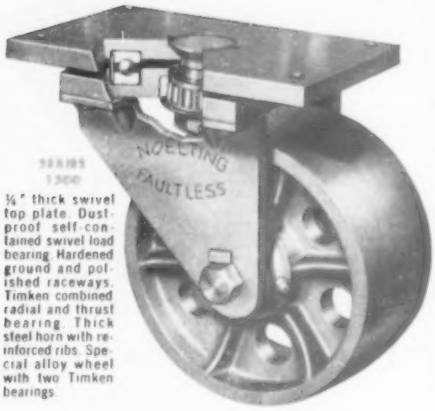
Dreadnaught Casters move loads up to



¾" thick swivel top plate. Dust-proof self-contained swivel load bearing. Hardened ground and polished raceways. Timken combined radial and thrust bearing. Thick steel horn with reinforced ribs. Special alloy wheel with two Timken bearings.

7½ Tons
PER CASTER

When it comes to *CASTER STRENGTH* for rolling the big loads along your assembly line, or around your stock pile area, Faultless engineered casters can give a lift to your big production and warehousing problems. Above, a Faultless Series 1300 Swivel Plate Caster and two Faultless wheels in special mountings easily handle a 22,000 lb. Caterpillar Diesel-electric engine with minimum manpower; a usual task for the Faultless Series 1300 Dreadnaught Caster.

Super strong HX300 Casters handle loads up to

5 Tons
PER CASTER WITH 8" WHEEL

For surplus strength to roll under cargoes that break down or damage ordinary casters, the HX300 Series, extra heavy duty swivel caster, will fit your specifications. It's precisely engineered throughout and constructed of quality materials to provide a caster capable of easily taking on 10,000 lb. loads, while keeping production lines moving with minimum handling costs.

1" dia. king pin. Thick steel top plate. Self-contained main load bearing has dust guard and grease seal. Timken radial and thrust bearing. 8" or 10" semi-steel wheels with Timken bearings.

ASK YOUR DISTRIBUTOR: Your nearby Faultless Industrial Distributor maintains a substantial inventory of Faultless Casters for immediate delivery. He and one of the strategically located Faultless Sales Engineers are available to work with you on every handling problem in your plant. Both are listed in the phone book Yellow Pages, under "Casters," and the Faultless heading.

INDUSTRIAL DISTRIBUTORS — SERVING INDUSTRY ECONOMICALLY — THE RIGHT HAND OF PRODUCTION

Faultless Caster Corporation
Evansville 7, Indiana

Representatives in Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Dallas, Detroit, Grand Rapids, Greenville, S.C., High Point, Indianapolis, Los Angeles, New Orleans, New York, Philadelphia, Portland, St. Louis, Washington, D.C., Canada: Stratford, Ontario.

NOELTING Faultless Casters

For more facts Circle 452 on Reader Service Card

FACTORY LETTERS

WHO NOMINATES WHICH?

Sir:

We read with great interest about your Top Ten Plants of 1959—and must pass along our feelings of admiration for all the fine work you are doing. We have one question—how is a plant nominated for consideration in next year's award?

Arnold Senne

Denver 17

► First, thanks for the bouquet on our May issue. It's letters like yours that stimulate our buildings editor, Oswald Stewart, to greater accomplishments in future building issues.

Regarding your question: There is no difficulty in being nominated for a Top Plants award. In this issue (page 84) interested readers will find a nomination blank for that purpose. However, even a letter alerting us to the existence of a new plant is adequate notice for nomination. After a plant has been nominated we send a questionnaire to get further information on it.—ED.

WHO DID IT?

Sir:

I wish to express my appreciation for your article on "Point-of-Use Storage" in the February 1959 issue of FACTORY (page 144). This concept interested me so much that I am preparing a paper on it for the Graduate School at the University of

Turn the page

FACTORY

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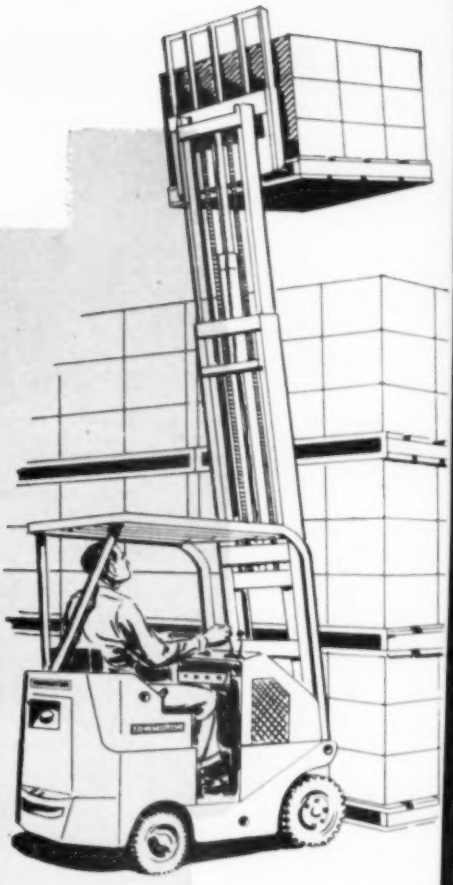
LOW CEILING! Less than six feet high, this Model 410 safely enters low-headroom vans, trailers, trucks and boxcars. And the new Towmotor High Free Lift Triple Mast—providing 65" of "free lift" at 180" of lift—permits floor-to-roof loading!



HIGH CEILING! Same fork lift truck stacks ton-loads of materials onto 12-foot tiers. Standard Towmotor Overhead Guard offers extra protection for operator. (Other models in "Van-Stack" series handle loads up to 3000 pounds.)

Introducing
Towmotor "Van-Stack"
Series Fork Lift Trucks

New Towmotor does double duty!

You'll profit in many extra ways by owning a new Towmotor "Van-Stack" Series Fork Lift Truck.

"Almost unbelievable—but I saw it!" said an amazed MHI Show-goer who witnessed this double-duty lift truck in action in June. Thousands saw it drive in low-headroom trailer, load it to roof, then stack heavy units on 12-foot high tiers.

This truck (only 32" wide) zips through congested 3-foot aisles—maneuvers sharp corners—hustles big loads indoors and out—and enters elevators for fast floor-to-floor service.

On top of all this, its increased hoisting speed, dual-entry convenience, powerful 4-cylinder "economy" gas or LP-gas engine, weatherproof instrument panel—and other exclusive Towmotor features—make it the foremost fork lift truck in 2000-3000 pound class! Ask for *"Van-Stack" Series Folder SP-25.* Write Towmotor Corporation, Cleveland 10, Ohio.

TOWMOTOR ® **-GERLINGER** LEADERS FOR 40 YEARS IN BUILDING FORK LIFT TRUCKS, CARRIERS AND TRACTORS

THE ONE-MAN-GANG

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The CASE of the "GHOST GANG" ROBBERIES

NEEDING ADDITIONAL WAREHOUSE SPACE, A LARGE EASTERN ELECTRICAL MANUFACTURING COMPANY LEASED FACILITIES NEAR ITS MAIN PLANT. IN SPITE OF PERIODIC CHECKS, VALUABLE EQUIPMENT DISAPPEARED REGULARLY FROM STORAGE AREAS AND LOADING DOCKS.

WHAT DO YOU MAKE OF IT, BILL? THIS IS THE FOURTH MISSING SHIPMENT IN A ROW!
LOOKS LIKE PROFESSIONALS, JIM—BUT I'VE GOT AN IDEA THAT MAY STOP THEM!
...SO, MR. ROBBINS, I THOUGHT THIS KIDDE "BLACK LIGHT" ALARM SYSTEM MIGHT BE THE ANSWER.
IT'S WORTH A TRY, BILL—I'LL CALL THEM TODAY.

LET'S GO, FELLOWS!
LOOKS LIKE YOUR TRAP HAS CAUGHT THE MICE, BILL!
BR-R-R
BR-R-R
O.K., YOU GUYS—REACH!
START LOADING THEM IN THE WAGON, BOYS!

Here's what Bill told the boss—

Kidde's new "black light" burglar alarm system provides tamper-proof photo-electric perimeter protection. Because it transmits a pulsating beam, it can't be jammed. And because it uses "black light," it can't be detected by thieves. The moment they break the beam, alarms sound. Best of all, this dependable Kidde protection is easy and inexpensive to install. Take a tip from Bill—find out more about Underwriters' Laboratories-approved "black light" protection. Write Kidde today.

Kidde

Kidde Ultrasonic & Detection Alarms, Inc.
832 Brighton Road, Clifton, New Jersey
A Subsidiary of Walter Kidde & Company, Inc., Belleville 9, N. J.

FACTORY / LETTERS

Begins on page 8

Southern California. In order to give your publication and writers proper credit, I would like the names and general background of those who prepared it.

T. J. Doherty
Engineering Schedules
Douglas Aircraft Co., Inc.
El Segundo, Calif.

► We are glad our "Point-of-Use Storage" article had such a stimulating effect on you. We wish you luck in the preparation of your paper on the subject. Also, we would like the opportunity of reading it when it is finished.

Please feel free to quote from our article in your paper. We would appreciate your crediting FACTORY with any material you use. This article was prepared by our own staff based on information obtained by our nine News Bureaus. In a round-up article such as this, you can well understand how valuable it is to have representatives in key industrial centers.—ED.

ADDRESS WANTED

Sir:

I would appreciate receiving the address of the American Production and Inventory Control Society mentioned in FACTORY, April 1958, under "Ideas of the Month."

Clifford G. Bigelow
Brooklyn 30, N. Y.

► The American Production and Inventory Control Society is at 330 South Wells St., Chicago.—ED.

CUTTING POWER COSTS

Sir:

I am inquiring about an article on industrial usage of electricity, explaining power factor and other related items. I would like a copy of this article, if possible.

Robert Blodgett
Industrial Engineer
Central Metal Products
Blytheville, Ark.

► We think the article you are referring to is one of these two: "Saving Big on Power Investment" in FACTORY's April 1958 issue

For more facts Circle 454 on Reader Service Card

You're invited to see how grease affects your profit picture

Texaco has produced a film called "Shear Magic". It explains why and how grease has kept pace with technical advances in your plant.

Like everything else, grease is no longer simple.

How could it be. In industry, heat is hotter and cold is colder. Speeds are faster, pressure heavier. All the more reason why you'll find this film interesting.

"Shear Magic" is not a sales film.

It is devoted entirely to helpful information about greases. You will see how only the right greases protect against heat, water, cold, dust, shock and other problems in a modern plant. You will learn how the right grease schedule – one planned exactly for your operation – can help you control costs.

If you'd like to switch off the lights and view this film, mail the coupon today.

TEXACO

Texaco Inc.
Room 2006, Dept. F-G-11
135 East 42nd Street,
New York 17, N. Y.

Please send me more information about a free showing of "Shear Magic" to my organization.

Name _____

Company _____

Address _____

City _____ **State** _____

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

For more facts Circle 455 on Reader Service Card

THIS NEW BOOK PROVES EDISON IS

THE HIGHER PRICED BATTERY THAT COSTS LESS

SEND FOR IT NOW!

If you operate battery-electric industrial trucks or plan to purchase them, then this new EDISON book **was written for you.** It tells and **proves** how an EDISON battery — through the years — **actually costs less.** Send for this book now. Write Storage Battery Division, Thomas A. Edison Industries, West Orange, N. J. In Canada: International Equipment Co., Ltd., 90 Bates Road, Montreal, P.Q.

COMPARE EDISON

1. Longer life — lower depreciation
2. Reduces maintenance cost
3. Durable — no sudden failures
4. Full shift performance
5. Fully automatic charging
6. No corrosive fumes
7. Lowers truck operation cost
8. Can stand idle indefinitely
9. Withstands temperature extremes
10. Other uses after heavy duty life
11. Lighter weight
12. Edison Nationwide Service

EDISON NICKEL ALKALINE STORAGE BATTERIES

Another Product of McGRAW EDISON

For more facts Circle 456 on Reader Service Card

(page 102) or "How to Save Real Money on Power" (September 1958, page 206). We take it you are studying a cost reduction problem related to power. We'd like to hear how you make out in solving it.—ED.

SORRY, NO NAME

Sir:

We have read with interest your article in December 1959 FACTORY referring to the costs of new plants. We would be very grateful if you could send us the address of the factory described under the subtitle, "Plenty of Air and Lots of Light," on page 52.

N. J. Meyer

O. Meyer & Co.
Soleure 2, Switzerland

► We'd like to be able to identify this factory for you. However, the information in this particular article was obtained under the promise of anonymity, so we are unable to disclose the source.—ED.

REPORTS CONTROL

Sir:

I am interested in obtaining information on the establishment of a Reports Control activity. If you have any information in regard to the above, please notify.

Richard J. Norman

Allen Park 10, Mich.

► Although FACTORY has mentioned control of distribution of reports in articles, we have not published one that delineates control procedure. You might get help on this from the National Office Management Assn., 260 S. Broad St., Philadelphia.—ED.

A GOOD GRIPE

Sir:

I have a gripe: It is the reluctance of shippers to follow specific instructions in purchase orders to ship via named carriers. We have had considerable trouble with shippers and it has cost us considerable in time and dollars. Some carriers are unable to make deliveries as we wish them because of their transportation

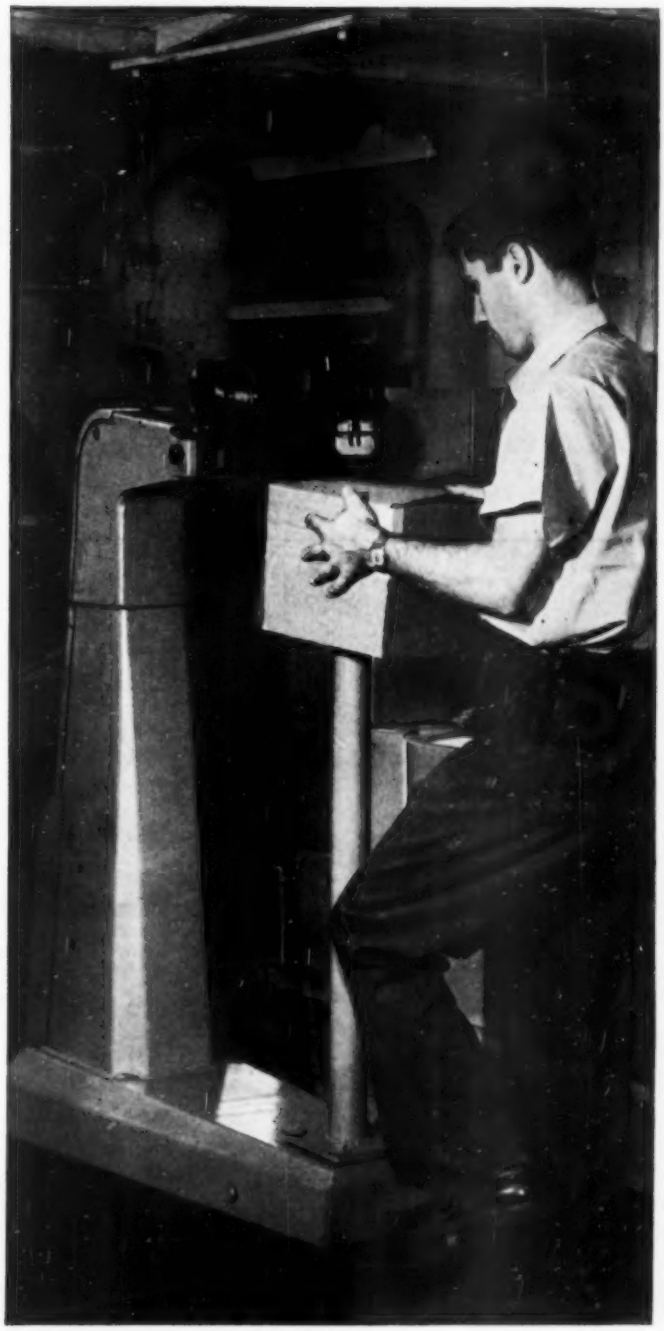
We call this the Bostitch GOLDEN BELT

You'll call it the fastest, lowest-cost box bottoming stapler you've ever seen!

The Bostitch Golden Belt Box Bottomer is a revolutionary new concept. The belt on top consists of 4000 cohered and partially formed copper-finished, wide-crown staples. This permits bottoming 1000 boxes without reloading. Four wide-crown staples completely bottom a container which would require 12 to 16 staples of smaller size. You can staple the entire length of the seam in one straight pass through the machine without reversing the box, thus cutting stapling time in half.

Your Bostitch Economy Man—one of 350 who work out of 123 U.S. and Canadian cities—has cost and speed facts on the kind of cartons you bottom. Call him—or drop a line to Bostitch, 608 Briggs Drive, East Greenwich, Rhode Island.

Golden Belt staples have 1¼" crown width, leg lengths of ½", ⅝" or ¾", and meet maximum spacing requirements of Rule 41.



Fasten it better and faster with

BOSTITCH®
STAPLERS AND STAPLES

For more facts Circle 457 on Reader Service Card

"KEX" Industrial Towel
Rental Service helps cut costs
at AiResearch

Modern plants use the modern way to handle wiping material requirements—through "KEX", the Industrial Towel Service that cuts costs, boosts efficiency.

Endorsed by the Garrett Corporation AiResearch Manufacturing Division in Los Angeles, the "KEX" Service System, through proper installation and control, has provided the most efficient and effective means of handling wiping material requirements at this plant. "KEX" can do the same for you.

AiResearch is serviced by Prudential Overall Supply of Los Angeles, one of the independent, franchised distributors available through the "KEX" nation-wide service.

See "Wiping Cloths" or write to "KEX" National Service, 295 Fifth Avenue, New York 16, N. Y.

"KEX" NATIONAL SERVICE
REG. U.S. PAT. OFF.

KEX

It isn't "KEX" unless it's imprinted with the "KEX" name.

For more facts Circle 458 on Reader Service Card

routes or limitations in licenses. We know the situation so we carefully designate in purchase orders the route and carrier. Almost without fail, shipping clerks ship as they please and cause us a vast amount of trouble.

George S. Gibby
The Gibby Press
West Topsham, Vt.

► We feel your letter outlines a very legitimate and painful gripe. We are probably sticking our neck out on this one, but we believe that instructions on shipping and routing should be followed wherever possible—especially where the cost factor is important.—ED.

DUST-FREE ROOMS

Sir:

We are installing a controlled environment room for precision manufacturing, processing, and assembly. A problem that confronts us is cleaning shoes prior to entering. We would appreciate hearing how other companies solve this problem.

T. Tinker
Manufacturing Engineer
Brush Instruments Div.
Clevite Corp.
Cleveland 14

► FACTORY has published several articles on this subject. Enclosed are tearsheets of the two most helpful, entitled: "World's Cleanest" (September 1957, page 124) and "Tops in Controlled Conditions" (March 1958, page 102). In addition, we are familiar with many plants that have encountered this problem and solved it successfully. Some of these are: Miniature Precision Bearings, Inc.; Texas Instruments Incorporated; The Barden Corp.; and Kearfott Co., Inc.—ED.

OUR MISTAKE

We wish to correct an error we made in the article, "Problem-Solving Math Made Easy," in the June issue of FACTORY. On page 89 the figure "38" that is given in the twenty-first line of the left-hand column should have been three to the eighth power.—ED.

B.F.Goodrich

News from your TIRE AND WHEEL ANALYSIS MAN

B. F. Goodrich All-Purpose tires speed operations for American Airlines

First to reach an American Airlines plane after landing —and last to leave before take off—is the tractor generator (above). It supplies power while the engines are stopped. Speeding the whole operation are B.F.Goodrich All-Purpose pneumatic tires. The new All-Purpose tread grips on all hauling surfaces, indoors and outdoors. Because it's pneumatic, the All-Purpose cushions the ride, protects load and floors, equipment and driver. If these are advantages you need and want in an industrial tire, the new All-Purpose may be your answer.

I can save you up to 50% on industrial tire costs

All-Purpose and "wired" tires are just 2 examples of the specialized industrial tires B.F.Goodrich makes. As your trained Tire and Wheel Analysis man, I know which tires are best for you. My survey of your operation costs nothing—can pay big dividends in money saved on tire costs. Mail the coupon today for my FREE services and tire recommendations.

Specify B.F.Goodrich tires when ordering new equipment.

New pneumatic is "wired" for puncture protection

Here's money-saving news from B.F.Goodrich for every industrial tire user plagued with puncture problems and the resulting high tire costs and work delays. B.F.Goodrich pneumatic tires now come "wired" for puncture protection. Under the tread is a shield of steel wire mesh that protects the tire body from puncturing objects. Abrasive scrap materials are no longer the problem they once were. No more premature tire failures—no more costly delays.

You may have the kind of severe operating conditions that these B.F.Goodrich "wired" pneumatics are designed to override. To find out, mail the coupon below.

The B.F.Goodrich Company
Department TW-759, Akron 18, Ohio

- ☐ Please send me information on All-Purpose tires.
- ☐ Please send me information on "wired" pneumatic tires.
- ☐ Please have my Tire and Wheel Analysis man call.

NAME_____

COMPANY_____

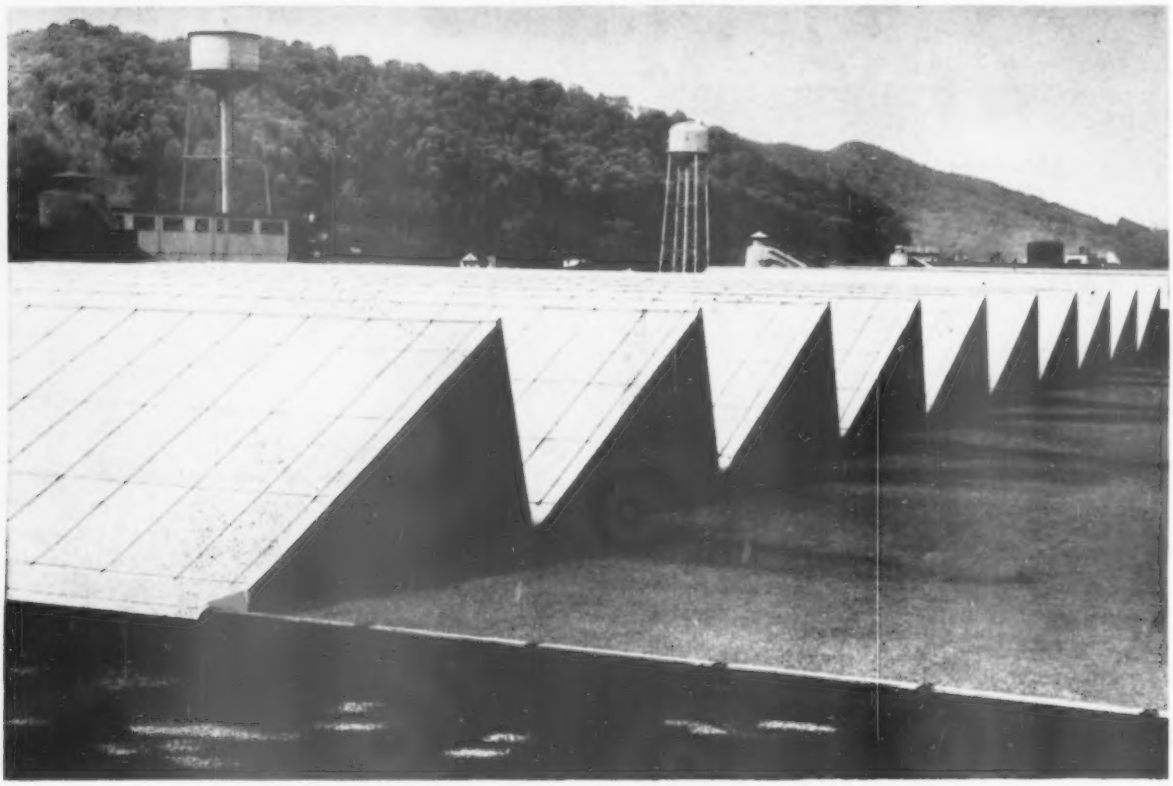
STREET_____

CITY_____ ZONE____ STATE_____

B.F.Goodrich *industrial tires*

For more facts Circle 459 on Reader Service Card

PROBLEM: the roof that wouldn't stop leaking



SOLUTION: a leakproof Overly-Goodwin batten roof

SAVINGS: thousands of maintenance dollars per year

When you have a floor covering problem, you automatically think of "those heavenly carpets by Lees." But when the problem is roof covering, the name to remember is Overly. James Lees and Sons Company, like so many others, turned to Overly to solve their most perplexing roof problem.

The built-up asphalt roofing on the 29 saw-toothed bays at Lees Blue Ridge Division, Glasgow, Va., was leaking incessantly. It was patched after every rain until the patches had patches. Yearly maintenance costs were running so high that Lees decided, for practically the same outlay, they could install permanently weather-tight Overly roofing. In 1953 we were given the contract to cover one bay. Thereafter, as funds were appropriated annually, we were commissioned to cover 5 bays in '54, 10 in '55, 7 in '56; and 6 in '59.

Almost 181,000 sq. ft. of 20 gage mill finish aluminum roofing will have been applied when the job is completed *without disturbing the plant's operation*. The latter point was especially important since thousands of dollars of carpeting are on the looms at all times and a stoppage of production would be costly. We were able to accomplish this by anchoring the Overly roof to the existing covering without opening the old roof.

Overly's batten roofing is the only proved roofing system obtainable today that carries a 15-year warranty. Send for complete data and our new catalog 8b-Ov. Write today.

OVERLY MANUFACTURING COMPANY
GREENSBURG, PENNSYLVANIA

For more facts Circle 460 on Reader Service Card

For more facts Circle 461 on Reader Service Card ➤

Are your $2/hr. men waiting for 30¢/hr. equipment?

It actually may cost *you* less than 30¢ an hour to own and operate a Clark Powrworker®. In arriving at our figure we included such "extras" as cost of charging equipment, 6% interest on the money you have invested in the equipment, an additional 2% interest as a miscellaneous expense, even the cost of current to recharge batteries. This was all over and above the normal charges of: cost of truck, depreciation, insurance, taxes, and freight.

But even at this "high" figure of 30¢ per hour . . . can you afford to keep manpower waiting for lack of sufficient equipment? In pure economics, it makes good sense to give your men the trucks they need . . . especially since it costs so little to own and operate a Clark Powrworker. Possibly, our headline should have read: "*Give every man his own truck!*" Startling? True. But we can show you figures to prove that this bold action is highly profitable.

Surely worth investigating. Send for the 16-page Powrworker booklet. We'll include the name and phone of a local representative who can review our figures with you in detail. Write or wire: Powrworker, Clark Equipment Company, Battle Creek, Michigan.

CLARK® EQUIPMENT

d in U.S.A.

For extra high *strength wire rope...*

use **CF&I-Wickwire** *Double Gray*

The CF&I Image reflects CF&I's experience as a producer of many steel products and CF&I's versatility in developing new products to meet exacting requirements . . . like Wickwire Double Gray*.

The special steel used in Double Gray provides extra resistance to the deforming effects of peening and crushing which occur on the drums and sheaves of heavy equipment. Double Gray also gives extra resistance to abrasion.

Because of these superior qualities, Double Gray rope quickly repays its slightly higher initial cost in safer, more economical operations. Use it wherever extra high strength wire rope is required.

For a free copy of our Double Gray booklet, write to: Advertising Department, The Colorado Fuel and Iron Corporation, 575 Madison Avenue, New York 22, N. Y.

**Wickwire Double Gray Wire Rope is made of extra-improved plow steel. Fortified by an independent wire rope core of the same extra high strength steel, Double Gray rope has a 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.*

WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**— Albuquerque · Amarillo · Billings · Boise · Butte · Denver · El Paso · Farmington (N.M.) · Fort Worth · Houston · Kansas City · Lincoln · Los Angeles · Oakland · Odessa (Tex.) · Oklahoma City · Phoenix · Portland · Pueblo · Salt Lake City · San Francisco · San Leandro · Seattle · Spokane · Tulsa · Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**— Boston · Buffalo · Chattanooga · Chicago · Detroit · Emlenton (Pa.) · New Orleans · New York · Philadelphia

6632

CF&I STEEL

For more facts circle 462 on Reader Service Card

FACTORY

Here Materials Storage becomes Materials supply without rehandling

Raw materials for molded goods are stored in these mobile bins or hoppers always ready for immediate delivery to the point of use. The handler rides on a Louden Step-On Type MotoVeyor.

The Ohio Rubber Company, a Division of The Eagle-Picher Company, uses Louden Monorail throughout their molded rubber goods plant at Willoughby, Ohio. One application of unusual interest and cost-saving effectiveness is the Materials Storage Department. This department not only uses but really consists of 2,500 feet of Louden Monorail track. Materials stocked for processing are here stored in mobile hoppers suspended from the trackage in this 90' x 260' indoor "monorail railroad yard." Loaded hoppers forming "trains" are made up to supply various materials as required. A Louden MotoVeyor moves them to whatever place the materials are needed, hoppers are dumped automatically, and materials fall directly into mixers on the floor below.

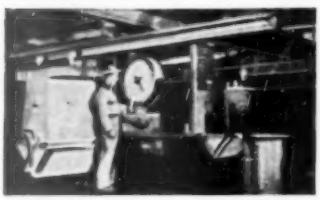
This is just one of the many handling problems that have been solved by Louden engineers. No other handling system permits such a wide diversity of uses as does Monorail. Over one universal handling system, easily installed and easily enlarged as occasion demands, your product can be handled from raw material to the wrapped package without one interruption to the smooth, even flow of production. Handling never becomes rehandling with Monorail.

When you have a materials handling problem or plant problem involving lifting and transporting loads, call on Louden for suggestions. Louden's unparalleled experience and proven engineering leadership combined with Louden's broad line of equipment can save time and mistakes. Write or wire today.

THE LOUDEN MACHINERY COMPANY

9508 Broadway, Fairfield, Iowa

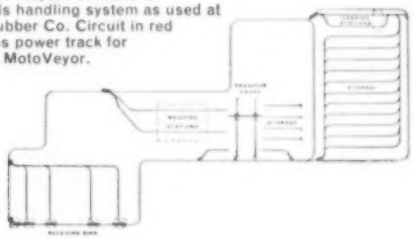
A Subsidiary of Mechanical Handling Systems Inc.



All loaded hoppers are weighed, marked as to contents and ticketed. This ticket provides both automatic inventory control and data for payroll computations.

Material is delivered directly from storage and automatically dumped into receiving bins feeding the mixers on the floor below.

Schematic layout of Monorail materials handling system as used at Ohio Rubber Co. Circuit in red indicates power track for Louden MotoVeyor.



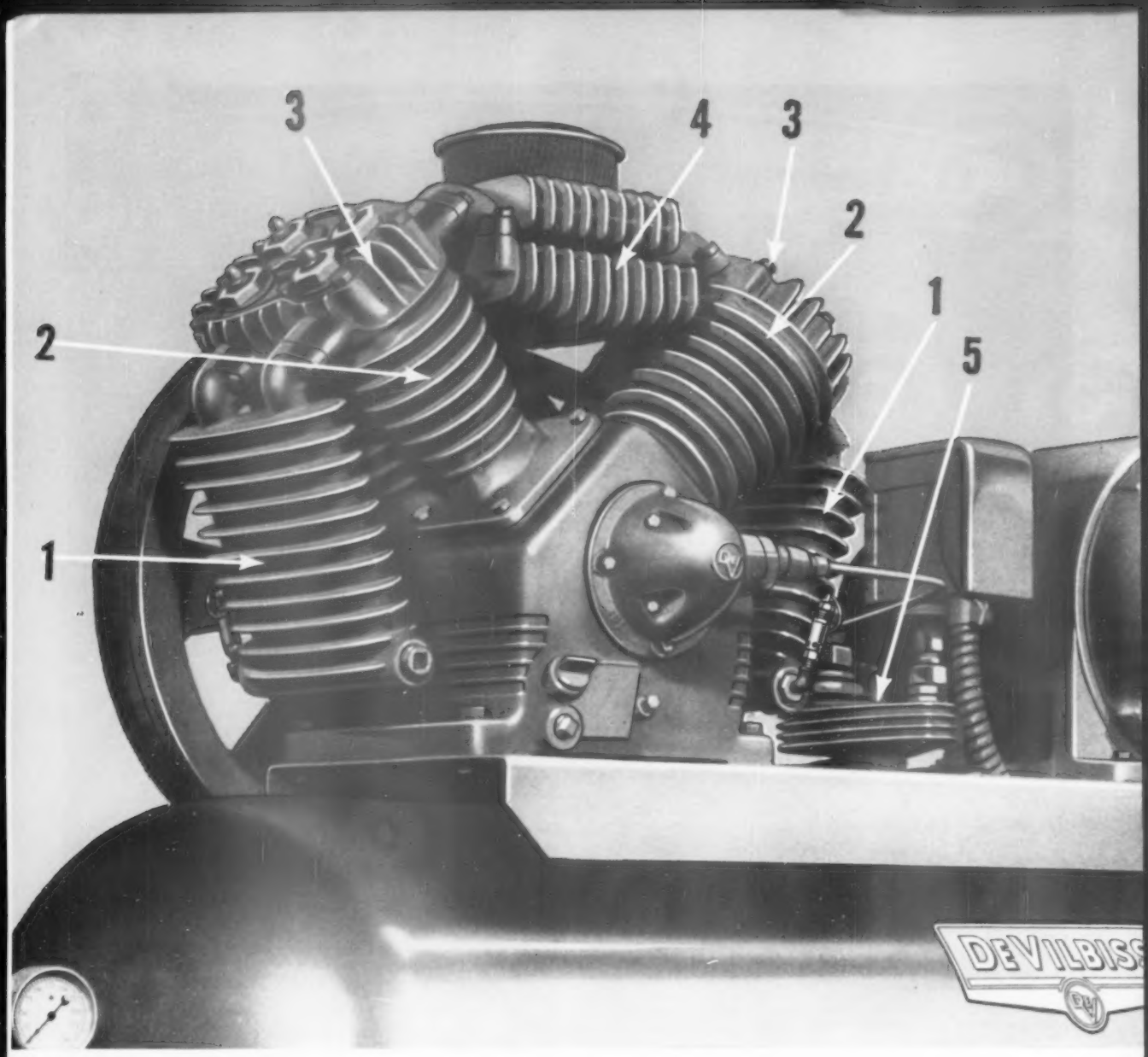
NEW . . . get the latest information on the best in modern materials handling methods. Full of how-to-do-it ideas . . . industry by industry. Write today for your copy of "COST-CUTTING WITH MONORAIL AND CRANES."

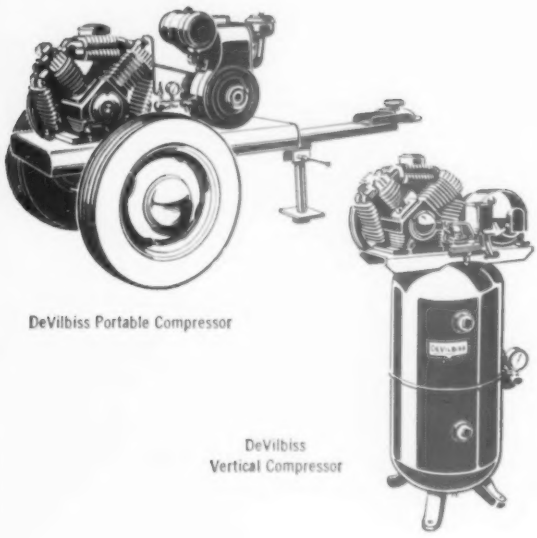
Louden

MONORAIL & CRANES

SINCE 1867...THE FIRST NAME IN MATERIALS HANDLING

For more facts Circle 463 on Reader Service Card





DeVilbiss Portable Compressor

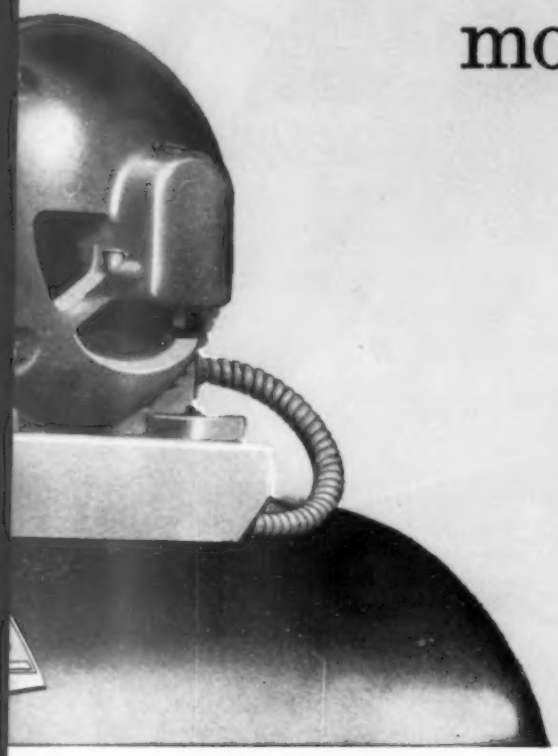
DeVilbiss
Vertical Compressor

THE cooling system of a compressor makes a big difference in operating efficiency. The hotter the air delivered into the tank, the greater the shrinkage when it cools. But a cool-running compressor delivers low-temperature, less-expanded air to the tank, resulting in fewer running cycles for any given air demand.

DeVilbiss compressors with their greater finned cooling area deliver air to the tank at lower temperature. Result: less air shrinkage in the tank, less frequent running cycles, longer service with lower power consumption.

Compare for yourself. Notice the finned, cast-iron

More finned cooling area makes DeVilbiss compressors more efficient



1. **Finned Intercoolers**
2. **Finned Cylinder Walls**
3. **Finned Cylinder Heads**
4. **Finned Aftercooler**
5. **Finned Check-Valve Manifold**

intercoolers (1), with large-capacity chambers which retard the velocity of the air to permit a longer cooling cycle between compressing stages. The deeply finned cylinder walls (2) and heads (3), designed for rapid and thorough heat dissipation. The finned aftercooler (4), that lowers the temperature further before air enters the tank. Even the check-valve manifold (5) at the tank is finned for maximum aftercooling.

More finned cooling area is only one of the greater efficiency features of DeVilbiss air compressors. Send for Catalog C-51, or call the local DeVilbiss representative for all the facts.

FOR BETTER SERVICE, BUY

DEVILBISS

THE DEVILBISS COMPANY
TOLEDO 1, OHIO

Barrie, Ontario • London, England • São Paulo, Brazil
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OVENS • DUST COLLECTORS • INDUSTRIAL POWER WASHERS
FLOW & DIP COATERS • SPRAY BOOTHS • AIR COMPRESSORS
SPRAY EQUIPMENT • HOSE & CONNECTIONS • MIST-COOLANT UNITS

For more facts Circle 464 on Reader Service Card

Discover the difference in Sylvania . . .

Sylvania Light Bulbs for every socket in the home provide the same benefits enjoyed by American Industry.

Sylvania Silver-White Mercury Lamps give you up to 22% more light than other types.

The maker of the world's most-wanted watch reports:

"Elgin craftsmanship demands the best in lighting... and we get it most economically with Sylvania Fluorescents"

G. G. Ensign
Manager, Watch Manufacturing
Elgin National Watch Company

The people at Elgin, and leading companies everywhere, find Sylvania Fluorescents give brighter light from the same wattage . . . have longer useful life . . . and produce far more light at less cost than all other brands.

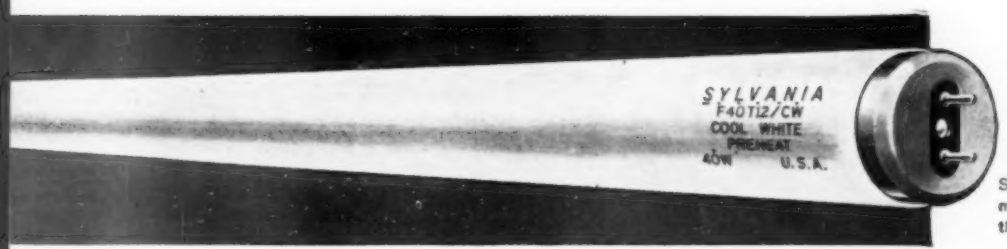
These superior product characteristics are the result of constant, intensive research in Sylvania Laboratories. This engineering vigilance has kept Sylvania consistently ahead in fluorescent lamp improvements. *No wonder Sylvania lamp sales have grown at a rate far greater than the entire lighting industry!*

You'll discover the same kind of superiority in Sylvania Mercury Lamps for streets, highways, airports . . . and in Sylvania Incandescent Light Bulbs for home and industry.

To learn how Sylvania gives you more light at lower cost, write for your copy of free booklet, "How to make lighting a better tool for profits."

SYLVANIA LIGHTING PRODUCTS
Dept. 9L-3108, 60 Boston Street, Salem, Mass.
In Canada: Sylvania Electric (Canada) Ltd., P. O. Box 1190, Station "O," Montreal 9

SYLVANIA
Subsidiary of
GENERAL TELEPHONE & ELECTRONICS



Sylvania Fluorescents maintain more than 7% greater output throughout useful lamp life.

For more facts Circle 465 on Reader Service Card

Infra-Red

heating comfort

WITHOUT DUCTS, BLOWERS OR HEAT EXCHANGERS

WITH

Perfection **Infra-Red GAS Heaters** *Schwank*

Fired by Natural, LP or Manufactured Gas

"Our high ceilings presented a difficult heating problem. However, with your Infra-Red Heaters our heating situation is absolutely perfect and the savings on fuel is most gratifying", says R. C. Sheets, Vice President of the Solem Machine Co., Rockford, Illinois.

"What has pleased us so immensely is the perfectly controlled temperatures that are maintained day and night; even during sub-zero weather. Most of our workmen wear only light tee shirts!"

Add to this a 97% reduction in electric power consumption; no maintenance headaches because there are no moving parts; low annual fuel costs; and you will understand why over 15,000 users of Perfection Schwank Infra-Red Heaters are equally as enthusiastic. CALL, WRITE OR WIRE FOR COMPLETE INFORMATION AND LITERATURE.

MATCH THESE FACTS WITH *ANY* OTHER HEATING SYSTEM!

Building Size: 200′ x 250′ x 28′ with 50′ x 50′ high monitor running the 250′ length—a total of 1,735,500 cu. ft. (not including office)

Construction: Galvanized sheet metal wall and roof with 1½" aluminum vinyl-faced fiberglas insulation throughout. Three large overhead doors—three small walk-in doors

Mounting Heights: 82 units installed at 26′—28′—42′—48′

Temperatures: 70° during working hours—60° nights & weekends

Degree Days: 5118

Installed BTU: 3,888,000

Fuel Consumption (Infra-Red): 43,969 gal. Propane at 10¢ (a total of $4,396.80 for the period studied)

Electrical Cost (estimated for Infra-Red): $14.00

Estimated Heat Loss (computed on ASHRAE basis): 3,640,000 BTU per hr.

Average Inside Temperature: 63.5° F

Degree Days For Period (base of 58.5): 4378

Probable Fuel Consumption (ASHRAE—efficiency of 80%): 5,975,000,000 BTU

Actual Fuel Consumption (Infra-Red): 4,020,000,000 BTU

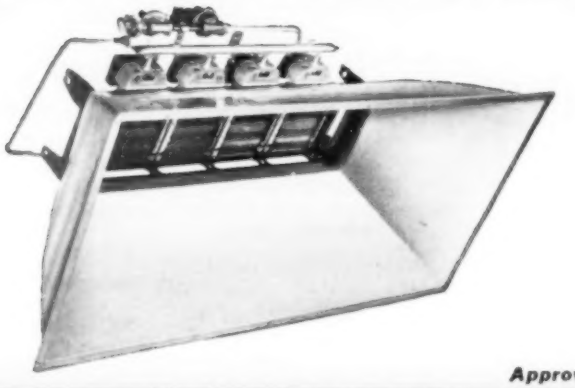
Period of Study: November 19, 1958 to March 13, 1959

Perfection industries 1135 Ivanhoe Rd., Cleveland 10, Ohio

division of Hupp Corporation / licensee of American Infra-Red Radiant Co.

Under Schwank U. S. Patents 2775294 and 2870830 and pending applications

For more facts Circle 466 on Reader Service Card



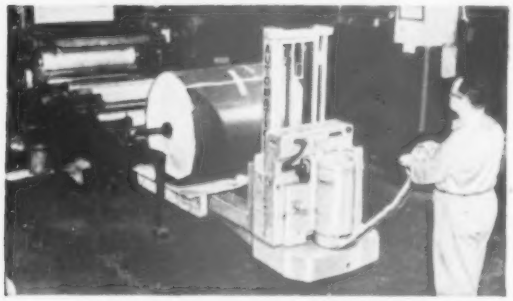
WARM THE MAN AND THE JOB
. . . *NOT* THE AIR

The rays of heat energy from these generators, like the rays of the sun, heat only the objects they touch and are not wasted on the air around the objects. Once the energy waves strike a person in their path, or the floor, wall or machinery, they are transformed into heat. The result is uniform heating comfort no matter how fast temperatures change.

Approved by American Gas Association, Underwriters, C.G.A. and C.S.A.

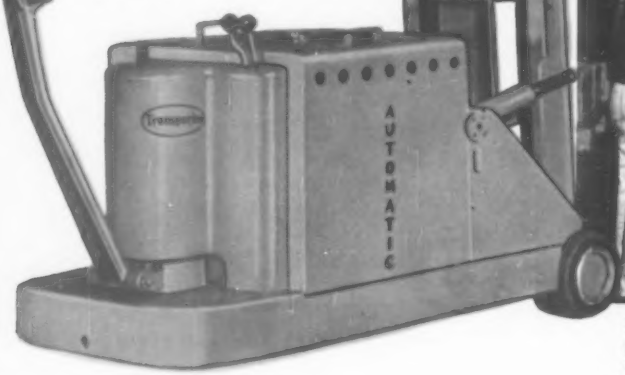
AUTOMATIC

Low-lift pallet Transporter with skid adapter handles both pallets and skids. Model WP has narrow battery compartment for normal use in congested areas... **Model WPY** has wide battery for heavy-duty use. **Models WP** and **WPY** available in capacities of 4000 lbs. and up.



High-lift Platform Stacker spots bulky skidded loads in production or storage areas. Model WLT...capacities 2000 lbs. and up.

High stacking for pallet racks or unit loads, yet easily enters low over-the-road trucks. Only Automatic offers the NEW SKYLIFT Mast...68" mast lifts 144"...for cantilever type stackers in 2000 lb. and 3000 lb. capacity. **WST Model** available in 1000 to 4000 lbs. capacities.



Straddle stackers handle loads in extremely narrow aisles. Load is carried on forks between outrigger arms... eliminates need for counterweight. **Model WAT** capacities range from 2000 to 15,000 lbs.

Transporters

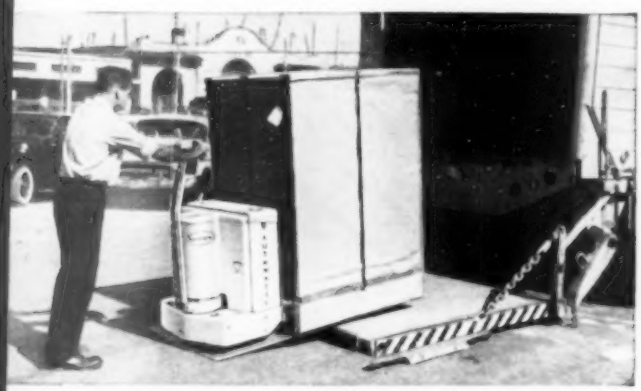
Versatile...Compact...Powerful...

and how they'll cut your handling costs!

For the 1001 jobs in your plant that a walkie-type truck can do, it's your best materials handling buy, dollar for dollar. Walkies naturally cost much less than rider type trucks. So, the same money buys you more units...mechanizes more jobs with greater plant efficiency. The lightweight walkie costs less to operate...and can work easily in areas unsafe or too crowded for the larger, heavier rider-type trucks, yet performs essentially the same functions.

Find exactly what you need in Automatic's Complete Transporter Line

There's an *Automatic Transporter* that's exactly right for your needs. If it isn't among the "popular six" shown here, you'll surely find it among the 50 standard models which can be varied to satisfy the most highly specialized requirements. And...you can have that just-right Transporter on convenient lease or budget purchase terms if you wish.



Transporter carried on truck speeds deliveries of skid loads of paper by the use of hydraulic tail gate. Model WW has narrow battery compartment for normal use in congested areas...**WWY** has wide battery compartment for heavy-duty use. **Models WW** and **WWY** available in capacities of 4000 lbs. and up.

Walkie-rider tractor speeds the selection of order picking...one of several tractor models. Capacities range from 200 lbs. normal to 1000 lbs. breakaway drawbar pull.

Electric Automatic® Industrial Trucks

Cost less to own, less to operate

AUTOMATIC TRANSPORTATION COMPANY
Division of The Yale & Towne Manufacturing Company
39 West 87th Street—Dept. M-9—Chicago 20, Illinois
WORLD'S LARGEST EXCLUSIVE BUILDER OF ELECTRIC-DRIVEN INDUSTRIAL TRUCKS

SEND FOR FREE ILLUSTRATED BOOKLET

16 pages of informative facts, figures and illustrations reflecting the latest knowledge in materials handling techniques. A reliable guide to finding the right solution for your materials handling problems. Send for your free copy today.

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☐ Send me details of budget purchase and lease plans.

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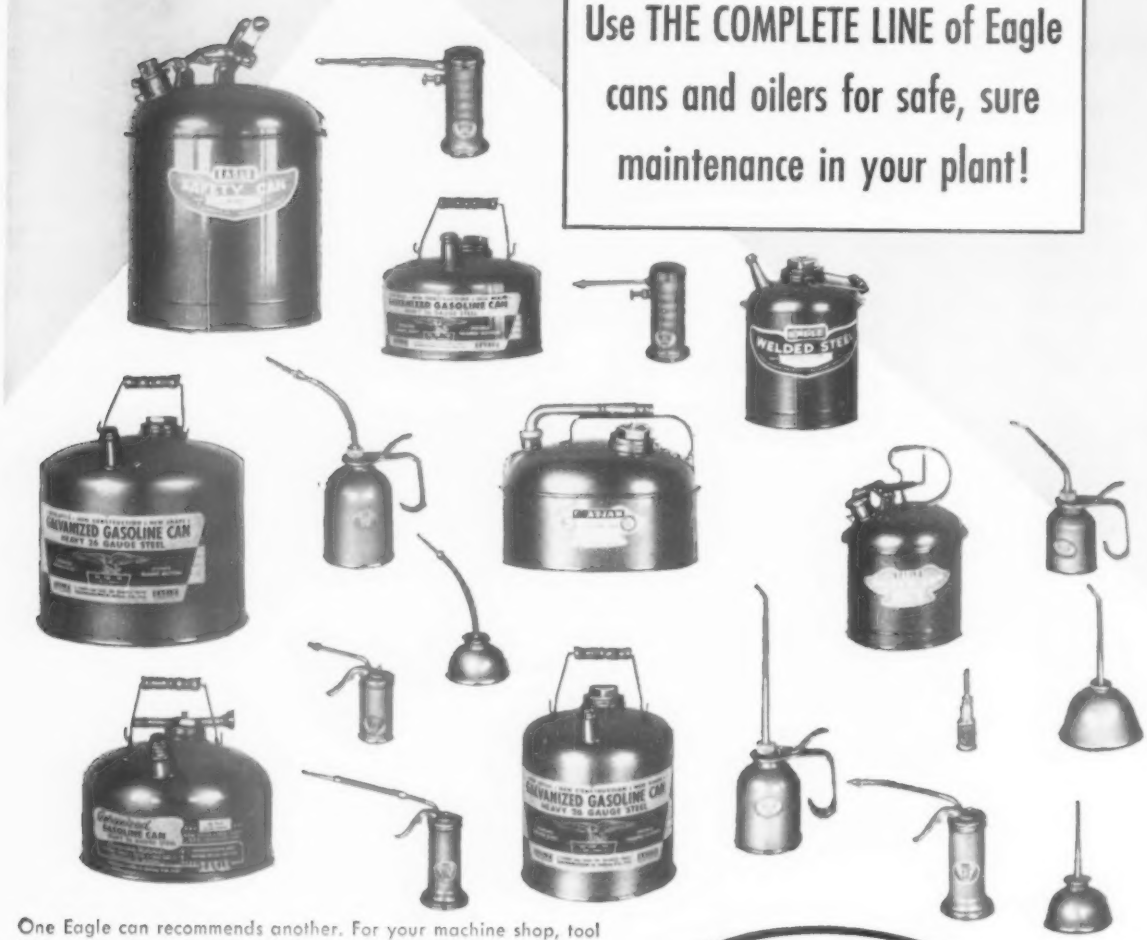
HERE'S HOW TO SAVE MORE MONEY!

Use THE COMPLETE LINE of Eagle cans and oilers for safe, sure maintenance in your plant!



One Eagle can recommends another. For your machine shop, tool kits, maintenance operations, there is an Eagle oiler, safety can, oil or gasoline can to fill the need. An Eagle is so indispensible! Eagle Safety Cans are Underwriters Laboratories and Factory Mutual approved. And Eagle pump oilers are guaranteed 5 years.

Use the ONE COMPLETE LINE . . . an Eagle oiler or can for every purpose.

Order the Complete Line NOW from your supplier.

Or write us for information.

Eagle products are stocked by leading suppliers in the U.S. and Canada.

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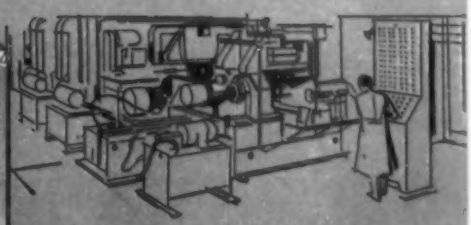
AUTOMATION BEGINS HERE

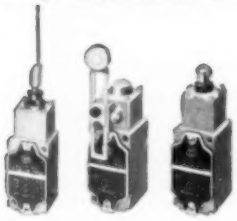
... Insist on Allen-Bradley accessories for continuous automatic production



In this broad line of Allen-Bradley accessories, each and every unit carries the traditional A-B trademark of *quality* that stands for trouble free operation. Rugged construction, and maintenance free, silver alloy contacts provide the reliability that is essential to the continuous operation of *your* automatic production machines.

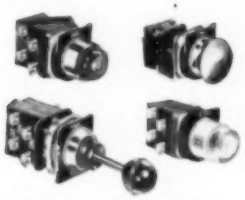
Profit from the experience of the leading machine tool builders . . . insist on Allen-Bradley *quality* motor control *all the way!*

Special push button panels can be assembled to your specifications.

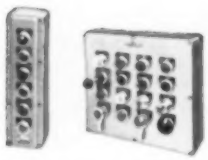


OILTIGHT LIMIT SWITCH
Bulletin 802T with sealed heads and bodies. Various operators.

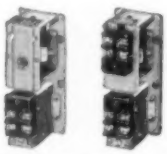
PRECISION LIMIT SWITCH
Bulletin 802 oiltight. Responds to very small operator travel.



OILTIGHT CONTROL UNITS
Bulletin 800T. Choice of push buttons, lights, and switches.

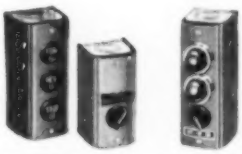


OILTIGHT CONTROL STATIONS
Bulletin 800T for up to 16 units in die cast aluminum enclosure.



PNEUMATIC TIMERS
Bulletin 849. Reliable and accurate. For on-delay or off-delay.

OILTIGHT PRESSURE CONTROL
Bulletin 836. For hydraulic systems with pressures to 5000 psi.



STANDARD DUTY PUSH BUTTONS
Bulletin 800. Up to three units, also pilot lights and switches.

FOOT SWITCH
Bulletin 805. In rugged die cast housing for toughest service.

ALLEN-BRADLEY
Member of NEMA

QUALITY MOTOR CONTROL

Allen-Bradley Co., 1321 S. First St., Milwaukee 4, Wis. In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

For more facts Circle 469 on Reader Service Card

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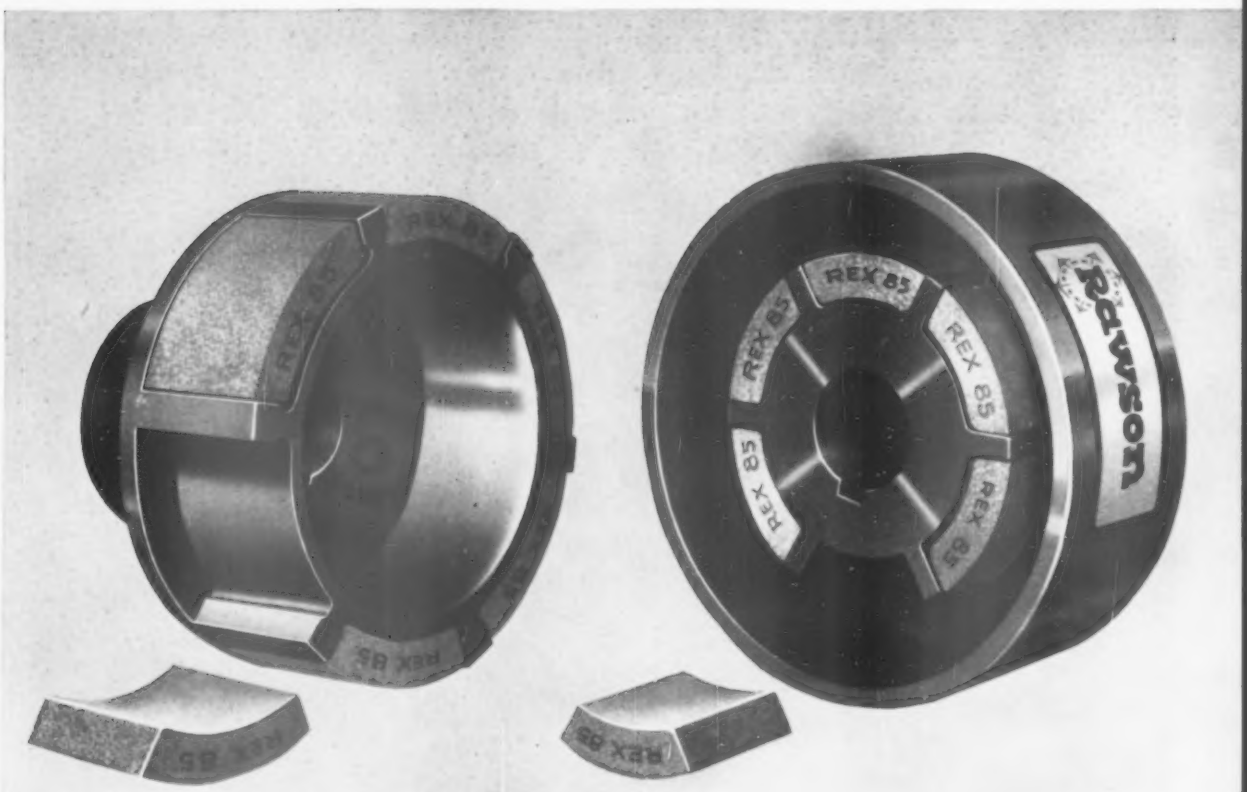
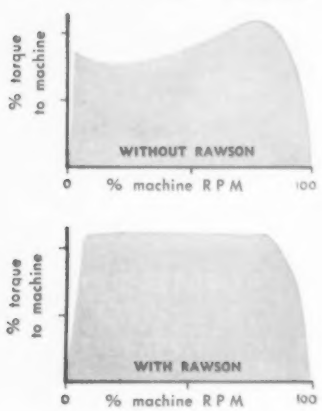
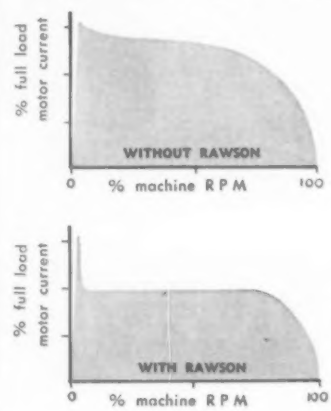


How Rawson Improves Motor Performance

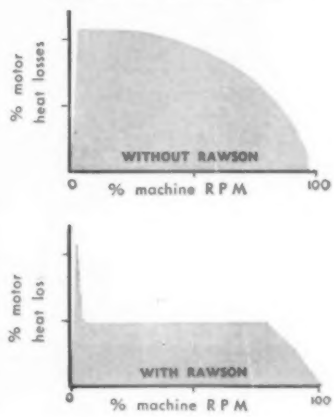
delivered starting torque



motor starting current



motor heat losses



"no load" Starts

Specify Rawson

Automatic Centrifugal Clutches and Clutch Couplings

Here is a major break-through in the development of automatic centrifugal clutches and clutch couplings! Rawson clutches and clutch couplings are designed with patented, exclusive metallic friction shoes instead of using fluid coupling devices or "brake lining" type materials. They deliver 100% slip-free power, provide full overload protection, permit smooth and gradual starting of high inertia equipment. This eliminates the need for costly special high torque starting motors and low-voltage starting equipment.

The segments, or shoes, in Rawson clutches and clutch-couplings are free-moving parts. As the driving half of clutch picks up speed, centrifugal force causes the shoes to contact the inside surface of the outer race, which is attached to the load or driven equipment. The shoes slip momentarily until friction at full speed causes the driven half to rotate in complete engagement with the driving half, both members then rotating as a unit without slippage or power loss. Jamming or overload of driven equipment causes clutch to slip — protecting motor against excessive overloading.

Rawson clutches and couplings drive in either direction and transmit up to 2,000 H.P. from nearly every motive source including A.C. and D.C. motors, diesel and gasoline engines or turbines. They function as direct couplings or as indirect drives through V-belts, chains or gearing and can be furnished with delayed shoe engagement for standby or dual drive units with load limit on starting or running. Rawson clutches and couplings are simple in design, fast and easy to install, entirely mechanical for trouble-free operation and they never require adjustment.

For increased efficiency, lower first costs, reduced maintenance and utmost protection even for the most delicate driving and driven equipment, specify Rawson clutches and clutch couplings. Ask your Rawson distributor or write us direct for your free copy of Rawson Catalog No. 141.

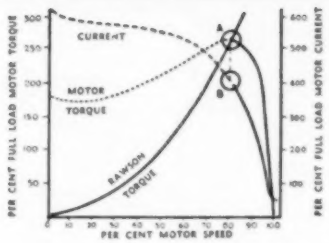
FORMSPRAG COMPANY
23609 Hoover Road, Dept. 101
Warren (Detroit), Michigan

Distributorships available in selected areas. Write for details.

FORMSPRAG COMPANY

World's Largest Exclusive Manufacturer of Over-running Clutches

and Protects Motors

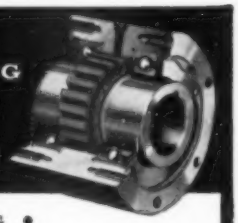


Using Rawson clutches or clutch couplings in a start-drive system lets you switch from costly high-torque motors to smaller standard, general-purpose motors for starting high-inertia loads.

Chart above shows how Rawson permits a standard NEMA "B" motor to start without load. The clutch does not fully engage until peak motor torque speed (A) is reached. Motor acceleration time is cut to a fraction of a second, decreasing the peak current period and allowing more efficient motor operation (B).

Thus, expense of reduced-voltage equipment is eliminated with the Rawson cushioned "no-load" starts, even on the heaviest machinery.

FORMSPRAG OVER-RUNNING CLUTCHES... UNIVERSAL APPLICATION!

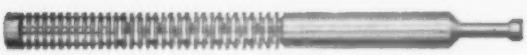


OVER-RUNNING • INDEXING • BACKSTOPPING

Modern Formsprag sprag-type clutches are practically unlimited in power transmission applications. They are universally used in automotive, aircraft and general industries. Complete range of capacities from small clutches at 50 in. lbs. to large bore backstops up to 136,000 ft. lbs. Complete Formsprag standard line includes bore sizes from ⅜" to 12". Specials engineered to your requirements. Write for the new Formsprag catalog.

NEW CP PORTABLE BROACH GUN CONVERTS ROUND PILOT HOLES TO SHAPES

You take the tool to the work with the CP Portable Broach Gun . . . a completely new technique in broaching. Operation is fast and simple. Broach is inserted in pilot hole and with a squeeze of the trigger the hole is formed or finished in a single, swift operation. Set-up time is eliminated since no jigs, fixtures or templates are required in most applications. Drilled, punched or cast holes can be finished to round, square, hexagon, oval, or irregular shapes in any work area. Angle Broach Puller, for close quarters, is also available.



The broach pulls a clean hole every time, and leaves it "mirror" finished. Hole sizing accuracy can be ±.0002. Unskilled operators can consistently produce accurate holes with minimum training time.

CP Power Cell weighs only 58 pounds, operates on shop air lines, furnishes oil pressure up to 7,000 psi. Easily moved from job to job anywhere in the plant. Also powers hydraulic riveters, squeezers, punches.

square

hex

oval

splined

keyed

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Pneumatic Tools • Air Compressors • Electric Tools • Diesel Engines
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Chicago Pneumatic Tool Co., 8 East 44th St., New York 17, N.Y.

I'm interested in broaching holes. Please send me a copy of Bulletin 581-2.

Address Dept. B-10

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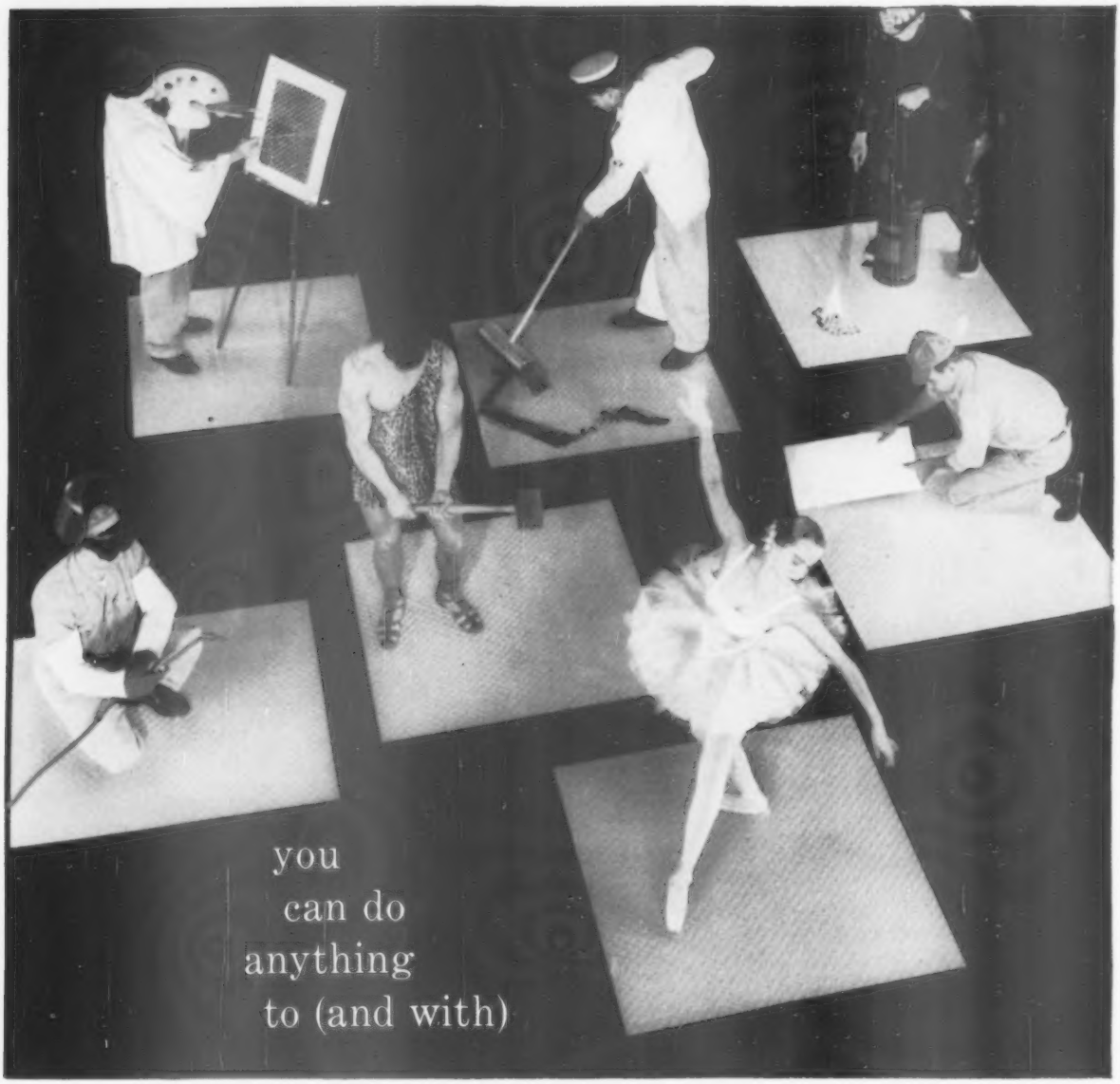
Company _____

Address _____

City _____ Zone _____ State _____



INLAND 4-WAY* SAFETY PLATE

As you can see, 4-WAY SAFETY PLATE is fireproof, can be bent, welded, hammered, painted. It can be cleaned with ease, can be cut, sheared, shaped to any curve or angle, drilled or punched. An outstanding feature of 4-WAY is its *slip-proof* character, as shown by the dancer. On catwalks, stair treads, truck beds, shop floors it provides positive traction, reduces hazards, safeguards employees.

Maintenance is extremely easy, fabrication and installation is simple. In many cases, no special skills are required—standard shop tools are all you need. On the floor, on the wall, on your machinery or your rolling stock 4-WAY SAFETY PLATE is durable, attractive and economical. 4-WAY SAFETY PLATE is available from your Steel Service Center in Large Pattern—gages $\frac{3}{16}$" to $\frac{3}{4}$", Medium Pattern—gages 16 to $\frac{1}{4}$" and Small Pattern in 18 gage.

INLAND STEEL COMPANY

30 West Monroe Street • Chicago 3, Illinois

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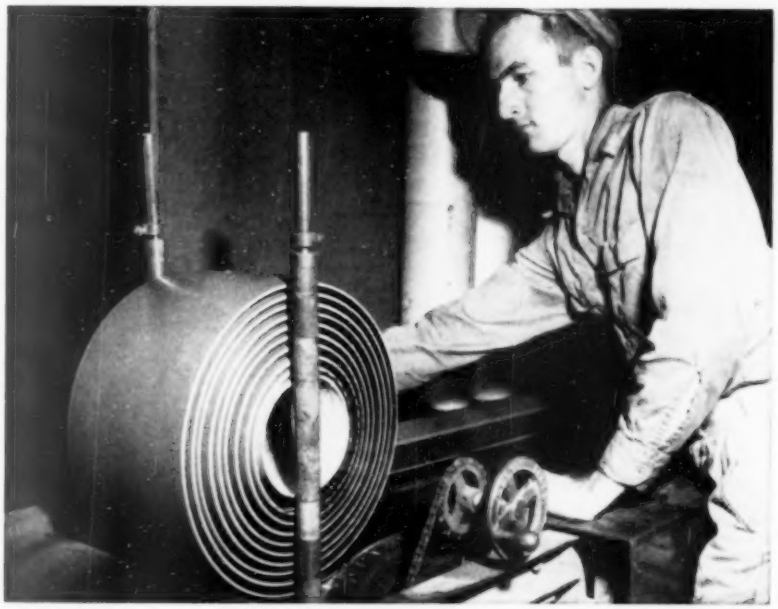
first in silicones

Dow Corning

SILICONE NEWS

production and maintenance edition • No. 30



NO WASTE HERE

Are you looking for a paper or paperboard that's specially treated to handle sticky materials? One that cuts product waste and saves time? This story will give you helpful ideas.

Camelback — the rubber compound used for retreading and recapping tires — is supplied to the retread shop in roll form, wound on a cardboard core. When the retreader gets down to the last few feet of stock (worth almost two dollars) the rubber often sticks to this cardboard core, and can't be pulled loose. If the retreader wants to save the material, he must use a solvent to separate it. Naturally, the solvent makes for a gooey mess.

To eliminate this waste, a leading camelback manufacturer, Better Monkey Grip of Dallas, tried various release coatings. Different types of waxes were applied to the cardboard . . . they didn't work. Next, polyethylene got a try-out, but it proved expensive, difficult to handle, and it tended to dog-ear.

Then they were supplied with a different type of core coating from Textile Paper Products, Crossett, Arkansas. The new coating: Syl-off*, a Dow Corning silicone paper treatment. As a test, a Syl-off coated core was wrapped with camelback and put under pressure for three months. When checked there was still no sign of sticking. And these test conditions by far exceeded actual conditions.

Textile Paper has found that kraft coated with Syl-off costs only two-thirds as much as moderately priced release sheets and only half as much as polyethylene-coated stocks. Ludlow Papers, Inc., Homer, La., supplied the kraft paper.

The Syl-off coated cores have been so successful that Better Monkey Grip has now standardized on them for all tread stock it distributes. ***No. 307***

*T.M. DOW CORNING CORPORATION

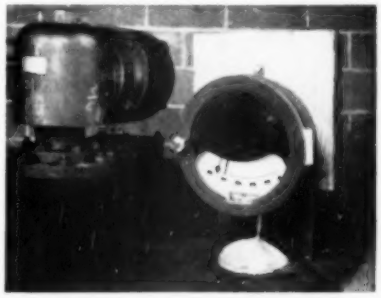
A BETTER GLAND SEAL

When you apply a valve sealant you want it to stay there, seal tightly and keep out harmful contaminants. Here's one that does that — and more.

A large Texas chemical company requires a tight packing seal on the shafts of seven 2-speed mixers in its light hydrocarbon section. Cuprous ammonium acetate and butadiene are combined in these mixers, which operate at 68 or 100 rpm. The environmental combination of chemicals and temperatures from 10 F to 200 F is pretty fierce. It could quickly ruin the effectiveness of many sealing compounds. Yet they've solved the problem. How?

With a nonreactive compound: Dow Corning Valve Seal. Applied only once a month to the asbestos packing in the drive-shaft glands, this silicone sealing material has kept the lines free of contamination ever since it was first applied in 1952. Dow Corning Valve Seal resists temperatures from —40 to 500 F, moisture, oxidation, and oils, in addition to most chemicals. A very versatile product, it lasts a long time and doesn't gum up.

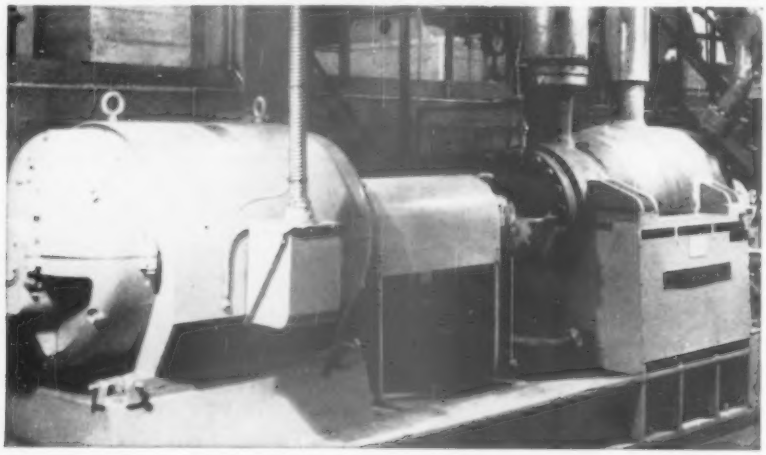
All in all, a sealant worth investigating for your own plant. ***No. 308***



THIS GREASE PAYS OFF

Many lubricants that do a good job at room temperature fail when the heat's on. Here's a story about a grease that doesn't fail . . . withstands 350 F!

Electric Machinery Manufacturing Company of Minneapolis stores its supply of coating asphalt in tanks. To be sure the asphalt remains in a liquid (Cont. pg. 2)



CUTS MOTOR COST 38%

When surroundings are humid, dusty, or in other ways contaminated, motors need protection. Formerly, total enclosure was the answer. But now there's a new kind of built-in protection available, based on new insulating materials. Here's how this open-skies protection worked for one company.

Minnesota and Ontario Paper Company was building a new plant at International Falls, Minn. The power house needed two 900-hp boiler-feed pump motors, a 600-hp induced-draft fan motor, and a 300-hp forced-draft fan drive motor. Because of the expected high moisture and dust content of the powerhouse air, plant planners originally specified totally-enclosed fan-cooled motors. However, because of the extra cost of TEFC equipment, they sought ways to avoid the enclosures. Was there a more economical answer?

Yes! Electric Machinery and Manufacturing Company recommended motors with Sil-Clad insulation. The Sil-Clad system, based on Silastic®, the Dow Corning silicone rubber, is virtually self-protecting. It has great resistance to heat, moisture, and airborne contaminants such as dust, salt spray, or chemicals.

Plant engineers took the advice and installed open, drip-proof motors with Sil-Clad insulation. By so doing, they saved $28,000 on the original cost estimate for TEFC equipment. That's 38% of the expected total! And, as an added bonus, the Sil-Clad motors provide a greater service factor (overload capacity) because of the increased thermal stability of silicone insulation . . . an important margin of dependability in any plant.

Next time you're considering a TEFC motor, ask about silicones first. *No. 309*

GREASE *(Continued)*

state, the tanks are kept under constant agitation and heated to 350 F. But this heat melted the organic grease in the agitator's reduction gearbox on the top of the tank. Unless the gears were cleaned and regreased every few weeks, the grease ran down inside the tanks and contaminated the asphalt. The problem needed a quick solution and they found it . . . in a silicone lubricant . . . Dow Corning 44 Grease.

This lubricant has excellent heat stability . . . won't run off or oxidize even at 400 F. It did the job so thoroughly for Electric Machinery engineers that they check the gearbox but once a year now. A saving of several hundred dollars in material and labor costs has been realized, and contamination ended, thanks to silicone grease.

If your plant has a similar lubricating problem, take a look at some of Dow Corning's silicone greases. *No. 310*

new literature and technical data on silicones

Metal Castings Release Easier, faster, when Dow Corning Silicones are used as release agents. Silicone parting agents reduce clean-up time because little or no build-up develops . . . they're quick spreading because of their extremely low surface tension . . . long lasting because they're heat stable . . . and they produce sharper detail, give the moldings a superior surface. Silicone release agents for several molding and casting methods are reviewed in a three-page data sheet. *No. 311*

If You Can't Stop the Heat you can service equipment to give continuous, reliable performance in spite of it. Dow Corning 41 Grease gives lasting lubrication from zero to 450 F in ball bearings on such diversified high temperature equipment as oven conveyors, flat-glass drawing machines, continuous welders, can-soldering rolls, and vulcanizer car wheels exposed to humidity and even steam. Typical properties of 41 Grease and specific examples of actual applications are contained in a 4-page brochure. *No. 312*

Fix For Good—Whenever temperature extremes are a problem, rubber parts or components give longer, maintenance-free service if they're made with Silastic, the Dow Corning silicone rubber. Acclaimed for their resistance to weathering, ozone, chemicals, moisture and steam, replacement parts made from Silastic help eliminate downtime and cut general maintenance costs. *No. 313*

Wherever Dissimilar Metals are in contact, a new silicone compound will help prevent galvanic corrosion. In addition, this compound offers the excellent thermal stability and moisture repellency normally associated with silicones. A concise data sheet describes the performance of this new product. *No. 314*

Cut Power Outages — Insulator flashover and power leakage are problems common to power installations in areas where industrial dirt and dust are prevalent. Power outages, flashovers, insulator cleaning and line maintenance problems have been drastically reduced by Alpena Power Company through the use of a Dow Corning silicone compound. The story of their contamination and cleaning problem and how it has been virtually eliminated is told in a reprint from POWER ENGINEERING. *No. 315*

Dow Corning Corporation, Dept. 5120, Midland, Michigan
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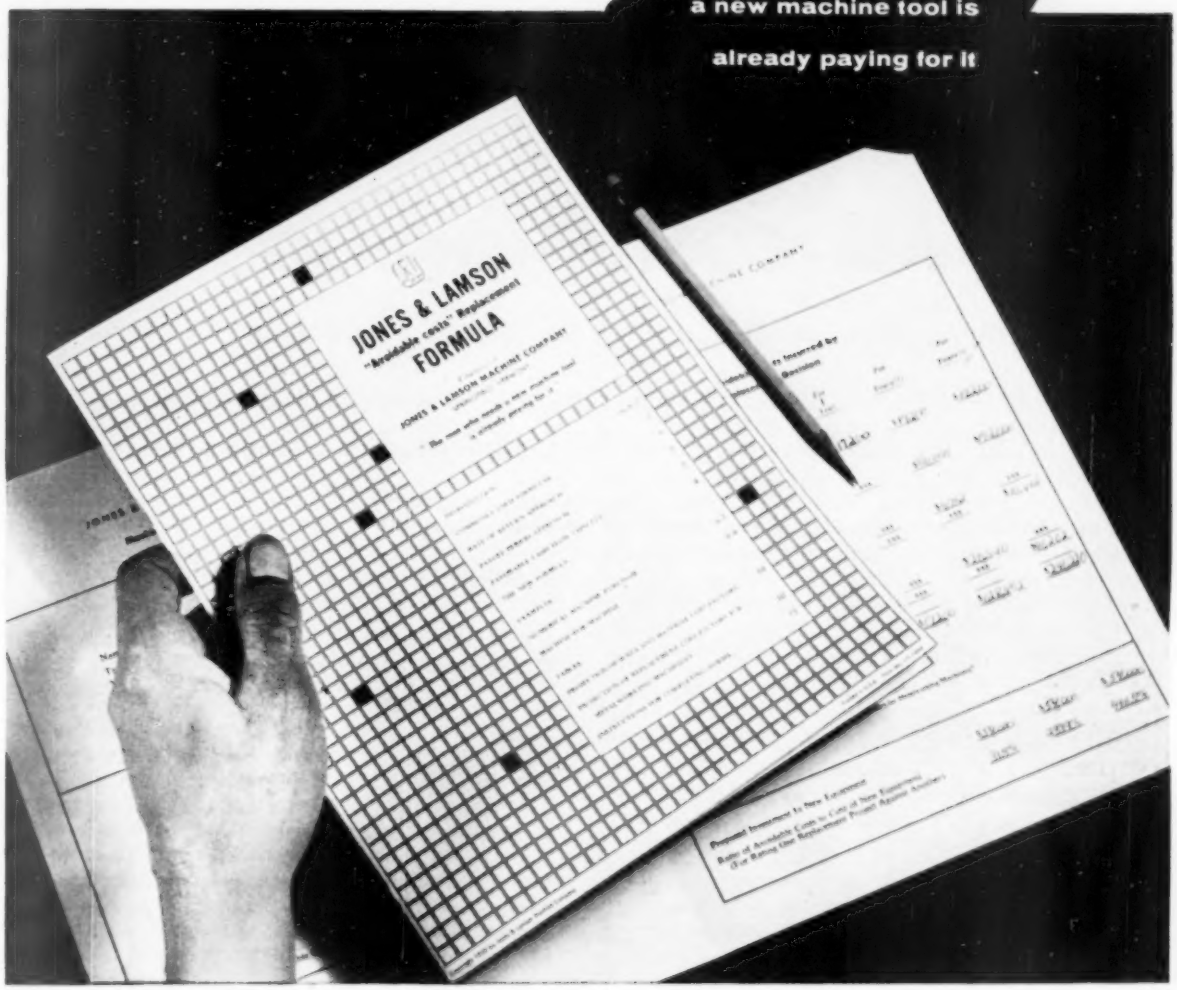
the man who needs a new machine tool is already paying for it



How to get Equipment Dollars from Management

To management men, nothing speaks so eloquently as facts. Take the men in *your* front office, for instance. When told that a new machine tool (or several new ones) is a "must", they may very well be inclined to agree. But they have to be *shown*.

In order to sell management, you must present an accurate, factual statement, comparing current productivity of existing equipment, with the productivity attainable with new, advanced equipment.

And this is where you must exercise extreme caution.

Why?

Because, practically without exception, the formulas commonly used for evaluating machine tool performance contain flaws, fallacies and limitations which are seriously misleading. They give an erroneous picture because they distort the facts.

Happily, J & L has the answer to this problem. It's the new J & L "Avoidable Costs" Replacement Formula, which gives you an easy, step-by-step method of productivity evaluation which is logical, accurate and reliable. This formula is tried and true. It gives you a clear, true picture and supplies you with the facts you need in order to get that new machine you're looking for.

For your copy of J & L's "Avoidable Costs" Replacement Formula, together with easy-to-use work sheets, write Jones & Lamson Machine Company, 505 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

For more facts Circle 474 on Reader Service Card

WHICH COMES FIRST— EMPLOYEE OR PROCESS AIR CONDITIONING?

"Both are essential," says Sylvania whose $2,600,000 worth of Carrier systems are returning day-in, day-out dividends

That air conditioning provides the proper climate for industrial processes is no longer questioned. Products like rayon, nylon, safety glass, movie film and pharmaceuticals could not be made without air conditioning. And it contributes to making goods faster, better and cheaper in hundreds of other fields—rubber, precision instruments, chemicals and optics among them. In all of these manufacturing operations, the value of air conditioning can be measured on production reports and P-and-L statements.

Air conditioning for the worker, however, is just as important as it is for products in process. What is more, its value in dollars-and-cents is equally and just as dramatically measurable. Take the case of Sylvania Electric Products, who have air conditioned some 15 of their plants in the past four years, both for process requirements and worker comfort. Production has increased as much as 7 per cent, while absenteeism and turnover have been cut in half. "In terms of worker comfort and efficiency, maximum quality control, improved safety and maintenance, our comfort air conditioning is as profitable as the air conditioning we use for process requirements," says Sylvania management.

Is your business caught in the middle of a cost-profit squeeze? Are you faced with rising labor costs and the consequent need to increase the productivity of workers? Do you operate in a tight labor market? Then put Carrier air conditioning at the top of your list of things to look into. Call the Carrier office near you. It is staffed with experienced engineers who work with industry every day. Or address inquiries direct to Carrier Corporation, Syracuse 1, New York.

Sylvania's new air conditioned plant in Altoona

How Carrier solves problems in the new Sylvania electron tube plant in Altoona

Modern, mass-produced electron tubes made by Sylvania must be as precisely built as a fine Swiss watch. Spacing between parts is often as small as .0002 inch or less and some wires are more slender than a human hair. Before this intricate assembly is vacuum sealed in glass, these delicate parts are prey to trouble-making dust, minute deposits of rust, the salts of perspiration and errant traces of acid-producing gases. All these ever-present dangers require the proper control of temperature, humidity and ventilation that air conditioning provides. But even in such a highly-automated plant as this, the comfort and efficiency of people are as important to the finished product as are processes.

In the main manufacturing area (shown above) involving 80,000 sq. ft. of space, these dual benefits of air conditioning are evident. Here humidity must be kept under precise control—low enough to prevent corrosion yet high enough to guard workers against the danger of burns from the 20,000-volt bombarder units they operate. Air must be free of particles down to 2-micron size. And workers must be alert and efficient 12 months a year. The prescription: 275,000 cfm of conditioned air to provide 80-degree maximum temperature and 45-to-50 per cent relative humidity.

Filling this prescription are two Carrier Centrifugal Refrigerating Machines with a capacity of 900 tons. These are located in the basement and supply chilled water to a pair of Carrier 29C Dehumidifiers mounted on the roof. Water sprays in these units (cold in summer, warm in winter) control temperature and humidity and their washing action supplements the air cleaning of mechanical filters.

In certain hot spots throughout the area, special problems are solved by air handling equipment. One of these is the Bulb and Stem Department where intense heat is required to melt glass, and where sulphur dioxide is used as a glass lubricant. Here the health of workers is even more important than the process—the twin problems being handled by the installation of exhaust systems which carry excess heat and fumes directly to the roof. The only other solution would have been to segregate this operation from the main area, with an attendant loss in production efficiency and flexibility. The same solution solves similar problems in the Unit Department and machine shop, where glass-melting, de-gassing and quenching take place.

In the filament coating room atmosphere requirements are so specialized that this operation is enclosed and provided with its own air conditioning system. Humidity here must be maintained at a low 25 per cent level to insure proper atomization of coating spray. And the temperature is held at 78 degrees to afford optimum working conditions for smock-clad machine operators. These conditions are maintained by a 50-ton Carrier Reciprocating Compressor and Single-Zone Weathermaker.*

In general and private offices the air conditioning requirements are so many and varied—due to window exposures, number of occupants and amount of lighting—that the air conditioning system is divided into seven separate zones. Separate climate control is provided in each zone by a reheat coil. One Weathermaker serves the office area, another serves a large conference room and the company store. Their chilled water comes from the same Carrier Centrifugal Refrigerating Machines that serve the main factory.

In the cafeteria the morale of Sylvania employees is kept high both winter and summer with a separately-controlled Weathermaker system. This affords an economical answer to an area used only a few hours a day.

In service areas in the basement are located tool rooms, the tube-aging room and material storage rooms. These are served by two other Weathermaker systems for reasons of control. The employees who work here enjoy the same Carrier comfort as in other portions of the plant.

* Reg. U.S. Pat. Off.

BETTER AIR CONDITIONING FOR EVERYBODY EVERYWHERE

Carrier

For more facts Circle 475 on Reader Service Card

Lugger about to pick up full container.

around the clock

Load's center of gravity is ahead of truck's rear axle.

plus emergencies, too!

Good Housekeeping

Container maintains safe, level position while being lifted.

seven days a week

Load discharges fast and clean—safely, too.

LOAD LUGGER

Detachable Container Refuse Disposal System

At Diamond Gardner Corporation, Red Bluff, California, the Load Lugger system operates around the clock, seven days a week disposing of huge volumes of waste generated in producing wood products. And when an emergency arises the Load Lugger system's ability to handle a big volume *fast* is even more vividly demonstrated.

Recently a big effluent tank required complete cleaning and had to be ready for use by the following morning. In twelve hours the Load Lugger truck moved fifty-seven big container loads of refuse to the disposal ground. While a loaded container was being hauled another was being filled at the tank cleaning site. There was no waiting, no delays, by either the cleaning crew or the truck. Furthermore, only one truck, the Load Lugger, was needed to complete the job on schedule.

Put the Load Lugger system to work for you and you won't have to worry about keeping either routine *or* emergency plant housekeeping right on schedule—with a minimum of equipment and manpower. You'll be interested in the complete Load Lugger story. Write or 'phone today.

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ASK ABOUT OUR LEASING AND FINANCING PLANS

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INDESTRUCTIBLE
SLAB CONVEYOR BELTING

TWICE THE QUALITY OF OTHER SLABS— YET THE COST IS THE SAME!

Low-cost, Long-life **Conveyor Belting** —straight to you from your "U.S." Distributor's stocks—

NO WAITING FOR FACTORY DELIVERY

U. S. Indestructible® Slab Belting is the low-cost belting especially suitable for a wide range of uses by industry. It is the right belt for light assembly line work and horizontal (and slight incline) package material handling. Your "U. S." Distributor cuts the conveyer belting slab to the size of your conveying equipment, and delivers it to your plant without delay.

U.S. Indestructible Belting is the long-life belting because it is made of flexible *natural* rubber, with thick coatings of supple natural rubber between flexible sturdy duck. The belt is orange-colored, with friction surface and skims. It has much higher adhesion than any other slab, yet costs no more. It fits the smaller pulleys of package handling equipment.

Contact your local "U. S." Distributor or use the coupon below.

United States Rubber
Rockefeller Center, New York 20, N. Y.

I convey the following materials_____
Please have your field representative call upon me to examine my conveyor belting requirements.

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Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

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WEATHERHEAD

offers one source for all tube fitting needs... a complete line of flared, flareless or pipe...

TUBE FITTINGS of BRASS, CARBON or STAINLESS STEEL

BRASS FITTINGS

S.A.E. 45° FLARE
USED with copper, brass, aluminum, steel and plastic tubing. PRESSURE RATINGS up to 5000 p.s.i. **Sizes: ⅛" to ¾".** Also available in 37° heavy pattern brass. Listed by U.L.; approved by A.G.A. Meets specs of S.A.E. Hydraulic Tube Fittings Standards and A.S.A. and A.S.M.E. codes for instruments and control piping.

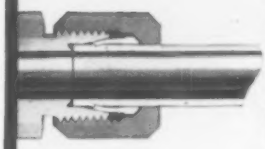
COMPRESSION
USED with copper, brass, aluminum and plastic tubing. PRESSURE RATINGS up to 2000 p.s.i. **Sizes: ⅛" to ¾".** Listed by U.L.; approved by A.G.A. Meets specs of S.A.E. Hydraulic Tube Fittings Standards and A.S.A. and A.S.M.E. codes for instruments and control piping.

SELF-ALIGN®
No flaring, soldering, welding—insert tube and tighten nut. USED with copper, brass, aluminum and plastic tubing. PRESSURE RATINGS up to 2000 p.s.i. **Sizes: ⅛" to ¾".**

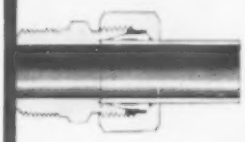
INVERTED FLARE
USED with copper, brass, aluminum, steel, Bundyweld and plastic tubing. PRESSURE RATINGS up to 3000 p.s.i. **Sizes: ⅛" to ¾".** Listed by U.L. Meets specs of S.A.E. Hydraulic Tube Fittings and A.S.A. and A.S.M.E. codes for instruments and control piping.

PIPE
USED with brass or steel pipe. PRESSURE RATING: up to 5000 p.s.i. **Sizes: to 2".** Meets specifications of S.A.E. TPHL Fittings Committee.

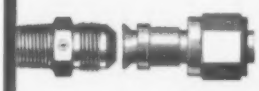
FORGED STEEL FITTINGS



"7000" SERIES ERMETO®
U.L. listed. Meets J.I.C. standards. S.A.E. approved "O" Ring boss design. Dryseal pipe thread. Needs no flaring. Available in either carbon or stainless steel. Carbon steel fittings have "Weathercoat" or cadmium-plate finish. PRESSURE RATINGS: up to 10,000 p.s.i. **Size Ranges—⅛" through 2".**



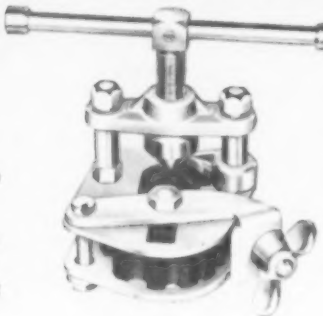
"8000" SERIES ERMETO®
Listed by U.L. for use with hazardous liquids, fuel equipment, refrigeration and gas; meets specs of S.A.E. and J.I.C. hydraulic tube fitting standards. Supplied as standard in cadmium-plate carbon steel and in stainless steel. Requires no flaring. PRESSURE RATINGS: up to 10,000 p.s.i. **Size Range—⅛" through 2".**



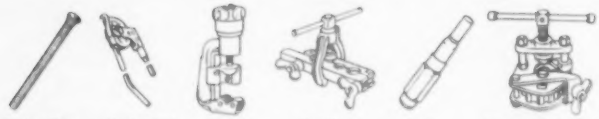
FLARE-TWIN—(2-pc. or 3-pc.)
37° FLARE STEEL TUBE FITTINGS
Listed by U.L., S.A.E. and J.I.C. approved. Used with J.I.C. and other soft steel tubing; also with copper, aluminum, and fully annealed stainless steel tubing. Meets S.A.E. standards for straight thread boss mounting. PRESSURE RATINGS up to 10,000 p.s.i. **Sizes: ⅛" through 2".**

FLARE-TWIN
Made in 3-piece and 2-piece assemblies. 2-piece type offers price advantage. "Weathercote" or cadmium-plate finish.

FAST! EASY! ACCURATE TUBE WORKING TOOLS



New rotary flaring tool for perfect tube flaring. Fast . . . one piece construction. Easier . . . "Dial - Matic" tube size selection. Accurate...tube stop automatically controls flaring diameter. Compact . . . easy to store. Available with burnishing attachment.



Spring-Type Bender | Mechanical Bender | Tube Cutter | Bar-Type Flaring | Tube Swaging | Automatic Flaring Rotary

THE WEATHERHEAD COMPANY

FORT WAYNE DIVISION • Dept. FA-8, 128 West Washington Blvd. Fort Wayne, Indiana

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CHOKED
in a tornado of abrasive dust!

FROZEN
for weeks at 75° C below zero!

BURIED ALIVE
in thick, sluggish mud!

nothing . . . but nothing stops Super-Seal open-type motors

Thanks to exclusive Poxeal and Silco-Flex insulations, Super-Seal motors have shown endurances that even enclosed motors couldn't match. Results and reasons available from your A-C representative or distributor. Or write General Products Division, Milwaukee 1, Wisconsin

Poxeal, Silco-Flex and Super-Seal are Allis-Chalmers trademarks.

ALLIS-CHALMERS A-1151

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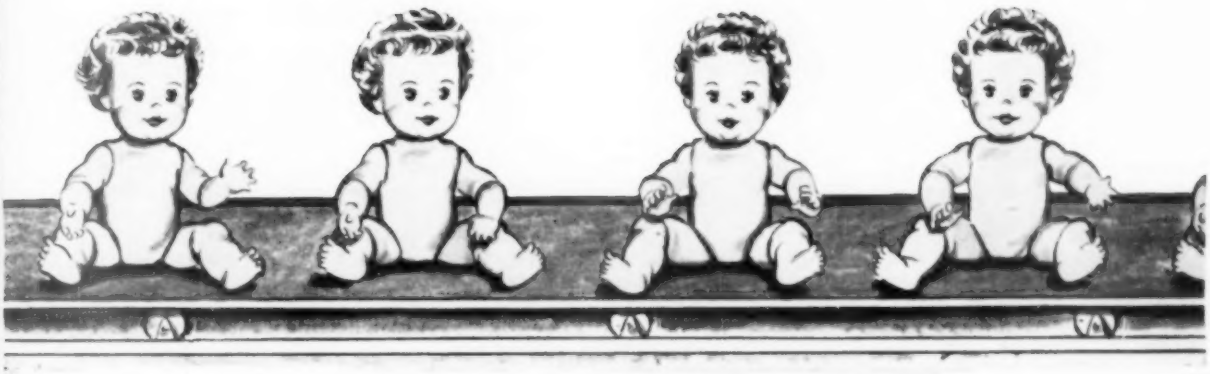
How the friendly AM man

And helped reduce accidents 50%, cut insurance costs for an American Mutual Policyholder.

The doll looked like an innocent plaything but on the production line it proved to be a painful problem.

The hazard was in sewing hair on the doll's head—a tricky operation that maimed many a finger and sent Workmen's Compensation costs soaring. Then a Safety Engineer from Mr. Friendly's Company—American Mutual—was called in.

After thoroughly studying the operation, this AM man suggested and helped to design special machine guards. At the same time, he set up an accident prevention program on a company-wide basis, including a Foreman Safety Training Course. As a result, the accident rate was cut by



solved "The Case of the Dangerous Doll"

50% and severe accidents by 66%! Production went up, insurance costs went down—as they have for so many AM policyholders.*

If you think your Workmen's Compensation costs are out of line, now is the time to see the man who can advise you on all your liability insurance needs—your *friendly* AM *man*. American Mutual, Dept. F-5, Wakefield, Mass.

*Continental Mills of Lewiston, Maine, another AM policyholder who profited through good safety experience, saved $86,458 in 14 years (difference between manual rates for this industry and rates actually paid) . . . gained another $20,888 through AM mutual dividends.

American Mutual

LIABILITY INSURANCE COMPANY

"The First American Liability Insurance Company" . . . a leading writer of Workmen's Compensation, all forms of Liability, Crime, Accident and Health Insurance.

Hall Industrial Water Report

VOLUME 7 AUGUST 1959 NUMBER 4

More International Trouble

Industrial water problems know no geographical boundaries. They are as prevalent and troublesome in Europe and Asia as they are in North or South America. And, no matter where they arise, they require expert handling. This is why calls for Hall Laboratories services come from all over the world. Hall engineers are able to solve some of the problems by correspondence, but travel halfway around the world to tackle others on the spot.

The problems themselves are no different because they occur in Saudi Arabia or Chile. Each offers its unique combination of factors, and the Hall engineer uses his training and experience to decide what is significant and what practical steps must be taken.

Power for India

Water conditioning for a 150-megawatt power station in India was started more than five years ago and successfully controlled entirely through correspondence.

When the high-pressure unit was ready for operation, Hall engineers had already set up a complete program of water and steam conditioning to avoid water-connected trouble in any part of the station. They established the chemical conditions to be maintained in water throughout the plant. They specified the analytical procedures and equipment required for control, the necessary conditioning chemicals and how to feed them. They outlined in detail the mechanics of operating the clarifying and zeolite softening equipment for treating evaporator feedwater.

The operators carried out the program to the letter. Progress was followed through water conditioning reports and analysis of water samples submitted on a fixed schedule.

One problem did occur. Scale composed of mica and iron oxide was found in several water wall tubes of one boiler the first time it was inspected. Investigation revealed that the mica came from mud which got into the tubes before they were installed. Furthermore, these tubes had been damaged in transit; repair by welding and heating with blow lamps produced some iron oxide.

The general superintendent of the plant wrote to Hall Laboratories, "I wish to take this opportunity to thank you for the valuable help you have rendered us during the initial operation of this power station."

Costly Boiler Outages

Deposits caused numerous annoying and costly tube failures in the 625-psig boilers generating steam for power and process at an oil company installation in Arabia. Analysis showed the deposits to be composed principally of iron oxide but to contain significant amounts of magnesium phosphate.

Hall engineer A. M. Henricks made a complete survey of the plant. He established the source of the iron oxide to be corrosion in the condensate system. He recommended the use of a filming amine (Hagafilm®). This effectively reduced accumulation of iron oxide in the boilers. Test specimens showed a reduction in corrosion rate of about 90%.

The magnesium was traced to evaporator carryover. Changes in internal baffling and increased blowdown to hold evaporator water solids at a lower level effectively reduced the carryover.

Five years have passed. Boiler deposits are not a problem and tube failures no longer occur.

Superheater Tube Corrosion

Operators of a utility plant in Jamaica were surprised to find active pitting in the inlet and outlet superheater headers of a boiler which had been in service for several years. Their surprise was natural because recommended water conditions had been continuously maintained both when the boiler was operating and when it was idle.

The nature and location of the corrosion convinced the Hall engineer assigned to the job that the pitting had occurred when the boiler was idle. He discovered that when the boiler was prepared for wet standby, the water was properly treated but the superheater was not completely filled. This left the superheater headers full of moist air—an ideal condition for corrosion.

The headers were thoroughly cleaned and changes were made to insure complete filling during idle periods. After more than two years there has been no further attack.

Globe Trotters

Hall service is available through thirty-five local offices in the United States, Mexico and Canada. Consultation and service on water problems take Hall engineers to many other parts of the globe. Regular trips are made to Colombia, Venezuela, Haiti, Dominican Republic, Puerto Rico, Jamaica, Newfoundland and Cuba. Occasional visits are made to such faraway places as Saudi Arabia, England, Italy and Pakistan. And plants in some other countries like Chile, Argentina, Brazil, France and India have been successfully helped with their water problems by correspondence only.

Let us know if we can help you make water behave properly in your foreign installations.

Water is your industry's most important raw material. Use it wisely.

Industrial Water Problems Require Special Handling

There are no "stock answers" to industrial water problems. For information on how the Hall System can help you solve your particular water problems, write, wire or call address below.

HALL LABORATORIES
DIVISION OF HAGAN CHEMICALS & CONTROLS, INC.
HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto

Hall Laboratories—Consultants on Procurement, Treatment, Use and Disposal of Industrial Water

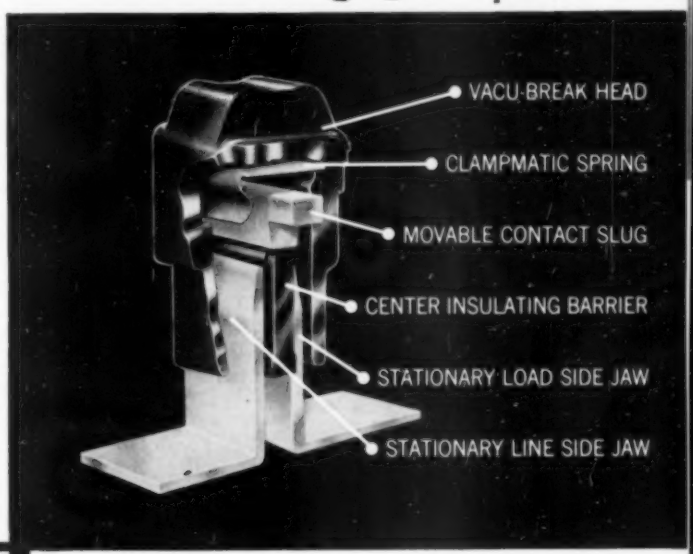
For more facts Circle 481 on Reader Service Card

FOR SAFETY'S SAKE BUY VACU-BREAK

There's a big difference in safety switches—a difference between maximum safety and halfway safety—low maintenance and excessive maintenance. These differences are readily apparent when you look at the design and operation of the BullDog Vacu-Break Clampmatic* Safety Switch.

THE VACU-BREAK: Contacts are housed inside compact arc chambers which have very little air space. When contacts are "broken" under load, arcs can't build up because of the lack of oxygen. Pitting and burning of the contacts are reduced to the absolute minimum. Maintenance is virtually eliminated.

POSITIVE SWITCHING: For positive safety, the Vacu-Break switching mechanism does not rely on tricky toggles or springs to trigger the disconnect operation. The operating handle is directly connected to the contact heads by means of a sturdy *metal* rod. Push the handle "OFF" and the switch *is off!*



Vacu-Break heads are connected directly to the switch handle. No toggles or triggers . . . no tricky springs. No danger of switching failure, either. One of several exclusive BullDog Vacu-Break features that set the performance standards for the industry.

Close-up of Vacu-Break head shows movable contact slug inside the compact, oxygen-limiting arc chamber. Clampmatic spring assembly assures bolt-tight contact, speeds "break". This combination guarantees positive, safe operation, long switch life.

WITHSTAND 100,000 AMP FAULT CURRENT: Vacu-Break Clampmatic switches equipped with current-limiting type Amp-Traps** were subjected to 100,000 amp short circuit current. *The switches were undamaged.*

Play it safe! Compare, recommend, *buy* . . . BullDog Vacu-Break Clampmatic Safety Switches. They cost no more than other switches . . . yet give you the maximum in safety and performance.

**Vacu-Break and Clampmatic are registered trademarks of the I-T-E Circuit Breaker Company.*
***Amp-Trap is a registered trademark of the Chase-Shawmut Company.*

BULLDOG ELECTRIC PRODUCTS DIVISION
I-T-E CIRCUIT BREAKER COMPANY
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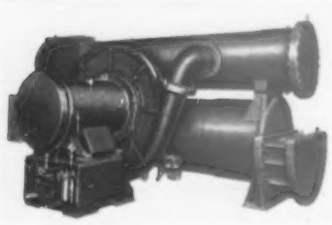
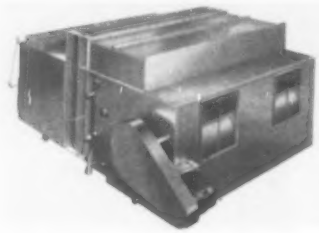
Centrifugal refrigerating machines for central-station air-conditioning systems.



Central-station air-conditioning units for industrial and office buildings.



Packaged commercial air conditioners, air- or water-cooled types, 3 to 20 tons.

One call for all

AIR-CONDITIONING EQUIPMENT: Refrigerating Machines • Water Chillers • Heating and Cooling Coils • Central-Station Air Conditioners Packaged Air Conditioners • Air Washers • **AIR-HANDLING EQUIPMENT**: Centrifugal, Propeller, and Axial Fans • Power Roof Ventilators Utility Sets • Specialized Fans and Blowers • **HEATING EQUIPMENT**: Firebox, Scotch-Type and Packaged Boilers • Steam, Hot-Water, and Gas-Fired Unit Heaters • Heating and Ventilating Units • Cabinet Heaters • **PROCESS EQUIPMENT**: Dust Collectors • Heat Exchangers Lube Oil and Jacket Water Coolers • Gyrol® Fluid Drives • Centrifugal Compressors • Mechanical Draft Fans • Surface Condensers

SOURCE...

can give you answers to all your air-conditioning problems

Whether you're installing a large central or "zone" system, or a system for a smaller plant—for the facts, the experience and the products to help you reach the right solution to your air-conditioning problems, call in American-Standard* Industrial Division.

You see, American-Standard Industrial Division supplies the major components that go into air conditioning – heating, cooling, air moving, cleaning, and moisture control—to give you one-source responsibility for quality and performance in equipment that is designed, engineered, and manufactured to work together.

There are offices in all principal cities, staffed by product specialists to assist with equipment selection and on-the-job problems. Call today. AMERICAN-STANDARD INDUSTRIAL DIVISION, DETROIT 32, MICHIGAN. IN CANADA: AMERICAN-STANDARD PRODUCTS (CANADA) LIMITED, TORONTO, ONTARIO.

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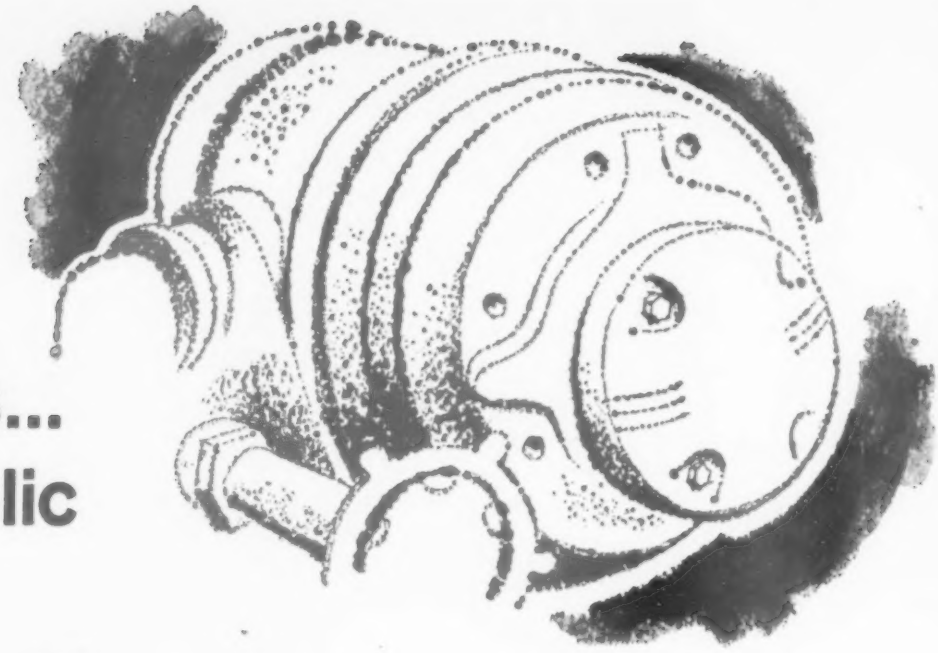


Pumps... hydraulic oil... and profits

Faulty hydraulic pumps cut production. Rust, varnish and sludge interfere with precise control—in many cases bring a production line to a dead stop and whittle profits. Special inhibitors in Sinclair Duro Hydraulic Oils have earned the reputation for protection against varnish and sludge. Furthermore, Duro's rust inhibitor has a preferential metal-wetting action that forms a tough barrier against water penetration. Next time management asks how you've cut costs, tell them you've switched to Sinclair Duro...and show them the results.

Call your Sinclair Representative for further information, or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y.

Sinclair

Sinclair
Duro Hydraulic Oils

For more facts Circle 484 on Reader Service Card

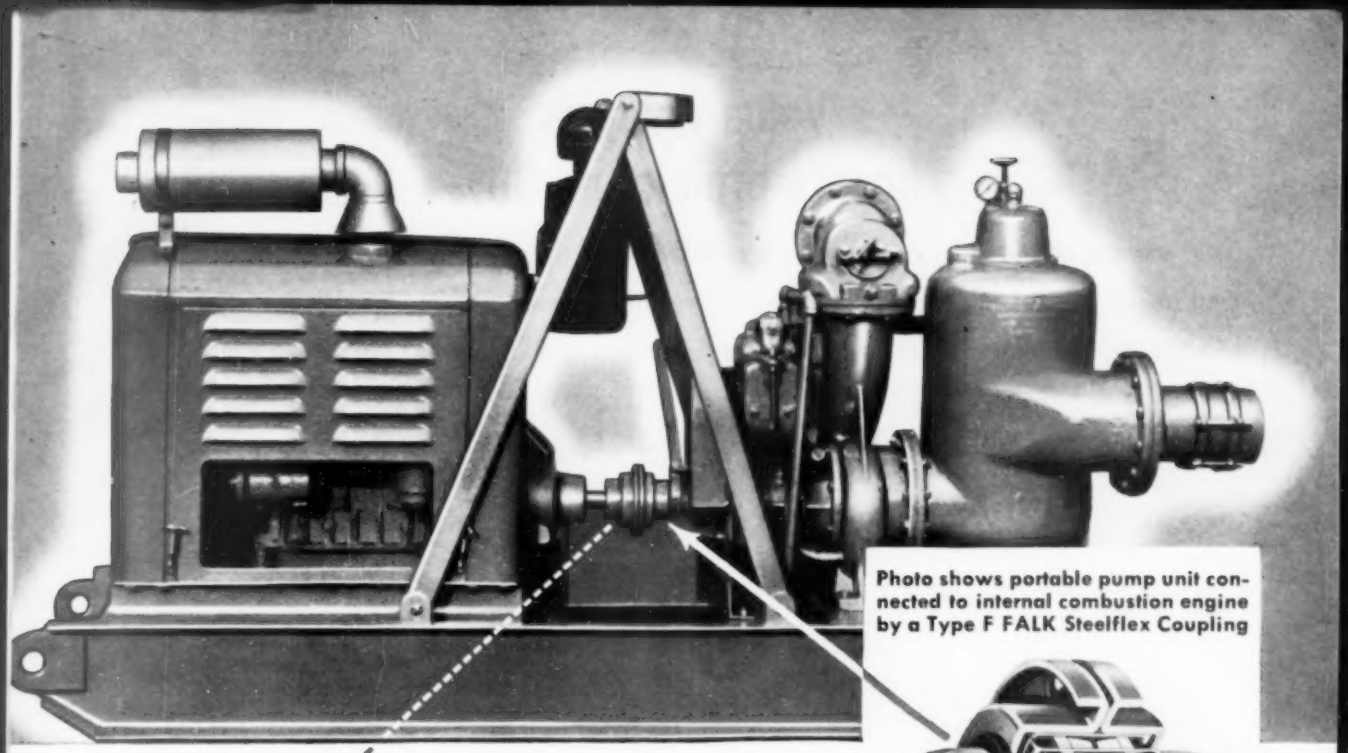
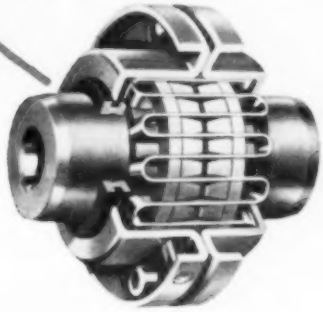


Photo shows portable pump unit connected to internal combustion engine by a Type F FALK Steelflex Coupling



How FALK STEELFLEX Couplings give your connected machinery Double Protection

FIRST: *They protect against shaft misalignment.* Some degree of shaft misalignment is unavoidable—and unless protective compensation is provided, additional loads are developed on shafts, bearings and other revolving elements. The result is excessive wear-and-tear—and often actual breakage....FALK Steelflex Couplings compensate for either angular or parallel misalignment—*or for the more serious condition involving both!* The exclusive Steelflex gridmember which joins the two hubs is not fastened to either hub; thus, either hub can shift in any direction without imposing a load on the other hub.

Yet, important as protection against shaft misalignment is to you, it is only one function of the *truly flexible* FALK Steelflex Coupling.

SECOND: *They protect against torque fluctuations* which create excess wear on connected machines and frequently induce destructive shaft misalignment. The exclusive FALK Steelflex grid-groove design cushions shock loads, dampens vibration, reduces impact loads as much as 30 per cent. You get this extra margin of protection that *can mean the difference between operating and breakdown!* You save on maintenance costs. And—you prolong the service life of your machines!...For complete information, ask your FALK Representative or Authorized Distributor. Or—**write direct for Bulletin 4100.**

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Representatives and Distributors in Most Principal Cities

Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

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Basic Type F FALK STEELFLEX COUPLING fills the needs of 90% of industrial applications

This cutaway view shows the exclusive Steelflex design which provides *torsional resilience with the strength of steel.* This torsional resilience spreads peak or shock loads over a relatively long increment of time, thus *greatly reducing stresses* in connected machinery.

The versatile Type F Steelflex can be used horizontally or vertically, without modification or special parts. It is ideally suited to 9 out of 10 applications. For unusual applications involving overload conditions, extended shafts, brakes, etc., standard designs of dual-purpose Steelflex couplings are available.

For most applications, you can give your machines the extra protection afforded by FALK Steelflex Couplings at no extra cost!

FALK

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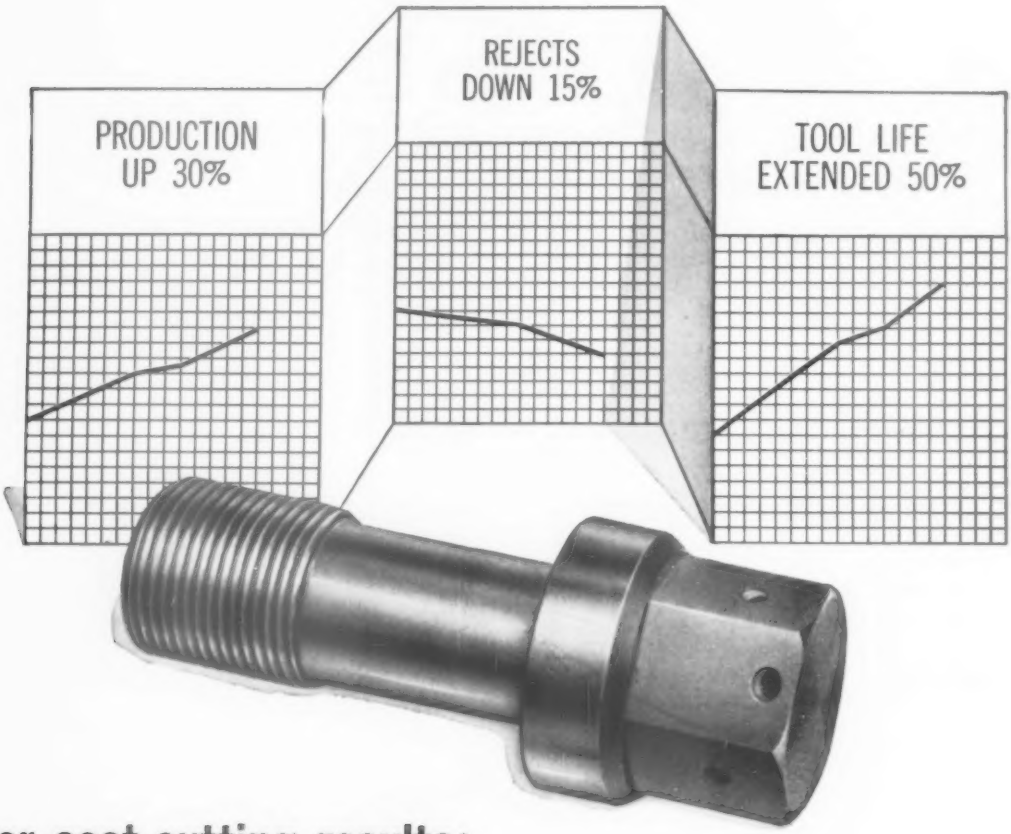
This was the outstanding result when a metalworking company studied and evaluated production of piston pin bolt heads with a Ryerson representative. The Ryerson specialist recommended Rycut® 40—the world's fastest machining alloy steel in its carbon range.



Other cost-cutting results:

In addition to boosting production, this risk-proof Ryerson alloy reduced rejects 15% . . . increased tool life 50% . . . and gave parts a better finish. Ryerson value analysis of materials and methods may help solve some tough problems for you. Contact your nearby Ryerson plant for details.

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FACTORY . . . PRESS TIME REPORT • AUGUST 1959

Looking Ahead in Business

You're likely to see some slowdown in industrial activity in the coming weeks.

The Index of Industrial Production for June again established a new record. At 155, it had risen 23 points in 12 months. But with the urgency taken out of steel buying, industry now will settle down to a more moderate pace.

Steel inventories are now higher than for the corresponding period during the strike in 1956. This means that in spite of the high level of activity in other sectors, the expected slack in steel demand will come in the current quarter.

•

The fall in steel demand will mean, of course, that steel output will drop off while producers and users of steel dispose of their stocks. So don't be surprised to see the Index of Industrial Production drop temporarily in the months ahead.

The drop-off in steel output will lead to some unemployment among steelworkers. But employment for the nation as a whole will continue to improve.

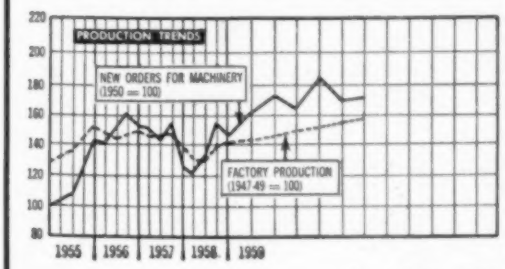
In June employment reached a record high of 67.3-million—about 2.5-million above last year. Unemployment also showed an increase in June. But it was due solely to seasonal factors—chiefly graduates coming into the labor market. The increase was well below normal for this period.

•

Consumer spending has been growing as employment and income have risen. Retail sales have been climbing, are now running about $2-billion a month above those of last year. And there has been a steady increase in instalment credit outstanding as a result of the sharp increase in sales of automobiles and other durable goods.

But buying on credit is likely to become more difficult and more expensive in the months ahead. The Federal Reserve Board has already acted to check the growth of credit buying. Twice this year it has boosted the discount rate on loans to commercial banks that borrow from the Reserve System to lend to business or consumers. Banks, in turn, will be stiffening their lending rates.

FACTORY FIGURES OF THE MONTH



Indicator	June 1959[p]	May 1959[r]	June 1958
New Orders for Machinery (exc. elec.)[1]	172.0*	171.0	138.0
Contracts for Industrial Construction[2]	116.0*	114.0	79.0
Factory Production[3]	159.0	156.0	134.0
Consumers' Prices (cost of living)[4]	124.1	124.0	123.7
Industrial Prices (materials, supplies)[4]	128.1	128.4	125.3
Manufacturing Employment (millions)[4]	16.4	16.2	15.2
Total Employment (millions)[5]	67.3	66.0	65.0
Unemployment (millions)[5]	4.0	3.4	3.4

[p] = preliminary [r] = revised * = estimate

Sources: 1. McGraw-Hill Dept. of Economics (1950 = 100); 2. Engineering News-Record (1950 = 100); 3. U. S. Federal Reserve Board (1947-49 = 100); 4. U. S. Dept. of Labor, Bureau of Labor Statistics (1947-49 = 100); 5. U. S. Dept. of Commerce, Bureau of the Census.

An increase in the interest rate on government bonds is also in the cards for the future. Such a rise will make lending to the government more attractive, and the Treasury will be bidding loans away from businessmen and consumers.

All signs thus point to tighter credit. Tighter credit is likely to slow the current pace of instalment buying. But steady demand for durables and other consumer goods is well assured.

•

Consumer disposable income is now over the $330-billion rate. More than $42-billion of that amount is being spent for consumer durable goods. By the end of the year disposable income will have gone up another $8-billion. And spending for durables will be over $44-billion.

Spending for non-durable consumer items, currently hitting an annual rate of $149-billion, will reach $152-billion by the end of the year.

Ideas of the Month

(For more information, circle item numbers on Reader Service Card next to back cover)

Say fond farewell to old-fashioned blackboard and chalk. Cargo Coder is slick mechanical coding gadget (*Nutting*) you can hitch to any manual or dragline cart or trailer. Hex knobs for firm grip, easy dialing, even with gloves on. Yellow numerals, black background for fast, correct reading. **(312)**

Be kind to your secretary by supplying uncoated-edge carbon paper (*Kee Lox*) in box that doubles as handy-dandy collating tray. **(313)**

Station Wagon is a new electric-powered burden and personnel carrier (*Moto-Truc*). With its four seats removed, it can handle long loads (pipe, for example), mail, maintenance equipment, and the like. Or, with coupler, it turns into a towing tractor. **(314)**

Or there's gas-driven Linksman, the well-known golf cart (*Lawson*), now available in industrial model that carries people and things. **(315)**

Booklet of the Month? Our choice: "The New International Inch —and how it will affect your operations" (*Pratt & Whitney*). New standard for USA, England, and Canada is 2 millionths shorter than old US inch. **(316)**

King-size rubber bands (*Goodrich*) measure up to 6 ft. long, stretch to 18 ft. Here's a won't-crush way of holding lightweight cartons together on pallets. Can be used over and over. Easily positioned by one man. **(317)**

Kudl-Pak translated into shop language is new storage box (*Rocket-dyne*) that cuddles delicate parts, precision tools in block of polyurethane foam—which compresses so 80% of "filled" box can still be made to hold object. Block is cut in halves with hill-and-valley surfaces to hold pencil-thin or bulging shapes in place when box is closed, ready for shipment. **(318)**

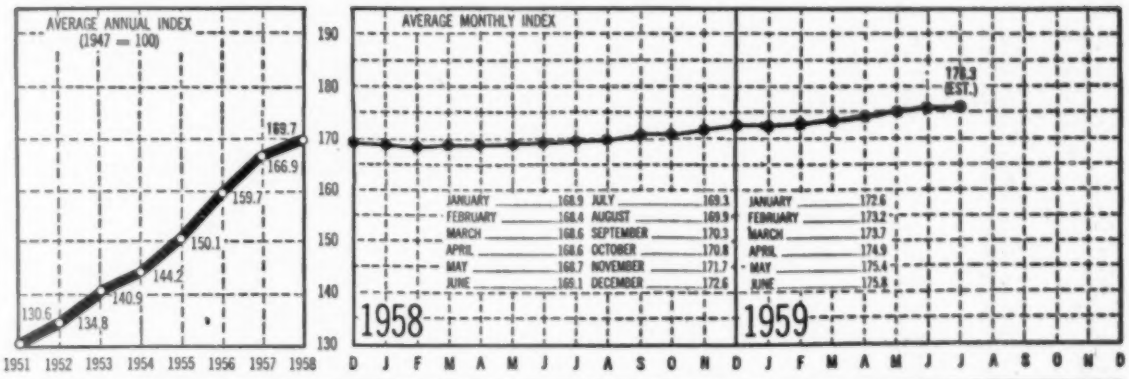
Natural outdoor daylight—or closest approach to it yet—is what maker (*Certified Electric*) promises with new, pure-white fluorescent lamp. Says soft light cuts eyestrain, helps reduce costly errors. **(319)**

Gotta special polishing or cleaning job? Newest abrasive wheels and rolls (*Behr-Manning*), of non-woven nylon fiber with grain dispersed throughout, are world's gentlest (we think) power-driven abrasives. **(320)**

More Ideas of the Month on pages 116 and 117

FACTORY . . . PRESS TIME REPORT • AUGUST 1959

Cost Index of Plant Maintenance



Costs Keep Moving Up

Maintenance costs will keep rising but no general price inflation is expected.

FACTORY'S Cost Index hit 175.8 (1947 = 100) in June. Costs fell for two items—motors and roofing—among the 39 materials in the Index. Costs of 29 items held as in May. The other eight cost more than in May.

For the first six months of 1959 maintenance costs averaged 2% higher than in the last half of 1958—and 3.3% higher than in the first half. Comparison of the cost of maintaining factory buildings and equipment in the first half of 1958 with that in the first half of 1959 shows that plant costs rose more (4%) than equipment costs (3.1%). Yet equipment costs rose more (2.2%) than plant costs (1.6%) when the second half of 1958 is compared with the first half of 1959.

Cost of plant maintenance will no doubt continue to rise throughout this year. But the rise will probably be in line with the increase in costs since the beginning of 1959. Higher maintenance costs from now until December will be due to a combination of moderately increasing labor costs and slowly increasing materials costs. The July Index of maintenance cost is now estimated at 176.3. By December of this year the Index will probably be approaching the 180 level.

The U. S. economy is not about to enter a period of rapid price inflation. Wage agreements are trending toward an increase of 7 to 10¢ an hour plus some fringe increases. The Federal Reserve Board has already tightened the supply of bank credit to the point where it is doubtful that a major inflation could get going.

	AVERAGE 1958	JUNE (Preliminary)	MAY (Revised)
Building and Facilities Index	160.8	166.2	166.1
Materials	139.2	142.6	144.0
Brick	148.8	152.7	152.7
Elec. fixtures	128.9	127.8	127.8
Elec. switches, boards, fuses	181.5	186.3	186.3
Elec. wire, copper	122.5	139.6	139.6
Glass	152.3	152.0	152.0
Gutters, spouts, ducts	172.9	177.1	177.1
Gypsum products	139.8	140.8	140.8
Heating equipment	127.4	127.7	127.7
Lumber	124.9	137.6	136.4
Millwork	146.9	157.3	156.6
Paint	130.1	130.1	130.1
Pipe, cast iron	170.4	170.4	170.4
Pipe, steel	192.0	189.9	189.9
Pipe & tubing, copper	145.7	156.9	156.9
Roofing	120.4	122.8	134.3
Sanitary fixtures	145.0	156.0	156.0
Sash, metal frame trim	146.9	141.6	141.6
Solder	117.5	126.5	124.6
Steel, structural	231.3	236.3	236.3
Tanks, steel	138.4	137.3	137.3
Valves & fittings	160.6	167.8	161.2
Wire mesh	160.8	162.9	162.9
Labor	175.2	181.9	180.8
Carpenters	160.7	168.6	166.6
Electricians	183.5	190.3	189.7
Painters	181.3	186.7	186.2
Equipment Index	173.6	179.9	179.4
Materials	173.5	176.0	175.3
Abrasives	160.3	162.6	161.4
Alloys, non-ferrous	117.2	126.1	126.0
Bars & plate, steel	223.5	227.2	227.2
Bearings	163.4	164.6	164.6
Belting	150.5	156.8	156.8
Bolts, nuts & screws	229.5	225.9	225.5
Chain	184.0	184.0	184.0
Controls (electric)	181.8	186.3	186.3
Gear-reduction units	181.7	181.7	181.7
Hand tools, mechanics	192.9	198.3	198.3
Lubricants	122.8	123.0	123.0
Motors	147.2	147.3	148.3
Non-ferrous metals	120.9	128.2	128.2
Precision tools	153.2	157.3	157.3
Pumps	184.8	194.8	194.8
Tools, cutting	166.3	168.5	168.5
Valves & fittings	160.6	167.8	161.2
Labor	173.7	182.5	182.1
All mfg. labor	172.2	180.3	180.3
Machine tool labor	175.2	184.6	183.9
FACTORY'S COST INDEX	169.7	175.8	175.4

FACTORY . . . PRESS TIME REPORT • AUGUST 1959

Looking Ahead in Labor

The fight against featherbedding is taking a top spot in labor-management forums. Not since James Petrillo's musicians made it a byword by demanding employment of standby musicians has it received such wide attention.

Today management is determined to eliminate many of the make-work rules that have developed in years of negotiations. It is part of the employer's new bargaining offensive.

Featherbedding has been in the center of the basic steel bargaining. In railroad negotiations slated for next month it will be at the heart of what already looks like the hottest negotiations in years. It is being challenged in the printing industry. And in construction a campaign is already under way to wipe it out—with some measurable success.

•

In none of these industries does featherbedding mean the same thing. Nor is it being attacked in the same way. But the principle is the same—the signal has been given to make war on the excessive costs of make-work rules in labor contracts.

Take steel negotiations. The industry's big counter-demand to the union's higher wages was an end to local plant working rules.

In past negotiations the United Steel Workers had gained job prerogatives that the steel companies wanted terminated. Union President McDonald said this plan would mean a "step backward" for the union. Among changes sought by the industry: elimination of overlapping benefits such as severance pay and unemployment compensation, enlarged vacation periods, simplified seniority units, more industry control over crew sizes, and other wasteful practices in the old contracts.

•

Railroading has the most complex labor contracts imaginable. They're replete with what the rail unions call "working rules" and management calls featherbedding. As old as the half-century of rail negotiations, these rules cover the size of train crews, the length of runs, yard vs. crew work, two men in a diesel, and similar areas of work. They all figure heavily in labor costs.

This year, says rail management, it is determined to eliminate some of these rules. The unions intend just as staunchly to stick by them.

•

In the construction industry a brand-new approach is being made to featherbedding. Contractors are trying to wipe it out—but with the help of the construction unions. It is a common-purpose approach aimed at cutting down construction costs and thereby getting more business for both sides.

An historic pact to eliminate featherbedding was made a year ago—known as the "12 Commandments." These are now being put into effect. Craft unions are cutting down on such practices as excessive travel-time pay, non-working stewards, long coffee breaks, bans on paint rollers, and so on.

This is by no means universal in the construction business. But the Association of General Contractors already proclaims its "good effect." One reason: Top craft union leaders, such as Plumbers' President Peter Schoemann, are backing the project. "We will take every practicable step . . . to see that contractors get, and our men deliver, an honest day's work for an honest day's pay."

•

Featherbedding is, in essence, an economic issue. Unions make these demands to spread or maintain employment, to ease work loads, to preserve jurisdiction. Management agreed to many practices in wartime, when employment costs could be written off. They are part of labor's resistance to automation—the musicians' counter to "canned" music, the printers' fight against mats already set for printing.

Economics is forcing the attack, too. In construction, industry and workers are losing out to the high costs of skilled craft labor—to the do-it-yourselfer and the industrial worker.

The industry-union team-up against featherbedding is, in big part, to sell the factory employer on contracting out his construction business. While craft rates are high compared to production-worker costs, the aim is to promote a "package" offer of the skilled worker with a new aim—to eliminate wasteful labor costs on the project.

SEE LABOR RELATIONS NEWS, PAGE 188

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FACTORY . . . OPINION

Let's Take a Look at Cost Engineering

THE ENGINEER and the "engineering approach" have never enjoyed more respect than they do today. But in the public's mind, and often in the minds of engineers too, the glamor seems to rub off mostly on the researchers and designers who do the spectacular jobs that get headlines. Result is that some of the less spectacular engineering accomplishments get overlooked—again even by the engineers themselves. Yet it seems to us these less spectacular application areas are often just as important as the headline-getters—perhaps more so.

We think cost engineering is a fine example of just this kind of thing—a rapidly developing field that offers a real engineering challenge.

It's a mistake to think that what's involved here is just another accounting or clerical function that an engineer ought to look down his nose at. If you happen to think this way, we suggest you take a new look at what's going on.

We were forcefully reminded of all this the other day during a visit with the manager of industrial engineering of an exceptionally well-run plant near Detroit. One of the main reasons for the plant's unusually good cost record, he said, was the work of his "budget engineer." "We found," said this man, "that when you know how, you can engineer your costs with almost the same precision that you can engineer your product or manufacturing process. Our budget engineer does precisely this. He is much more than a budgetary control man. He is the spark plug for our whole cost reduction activity."

This conversation was followed the next day by a discussion with another man about the relatively new (founded 1956) American Association of Cost Engineers. This lively organization now comprises over 600 members and has been growing rapidly. In the beginning its members were mostly men in the process industries, but now it has broadened its charter to include all types of manufacturing.

To us, the significant aspect of all this is that today we look upon such developments as interesting but not startling. Yet just a few years ago it would have been real news merely to report that budgetary control was being exercised out of an engineering department. When there was any control worthy of the name, it was almost always an accounting function. To have added that the control was under the supervision of a man from Mars called a "budget engineer" would have aroused real excitement. And the statement that a national society was fostering the concept of cost *engineering* would probably have brought a horse laugh.

It would be nice if we could stop here. But there are a lot of pitfalls in cost engineering work too, and we editors have a chance to see them as we get around the country. Here are a few to look for:

• **We still see a lot of idle lip service being given to the idea, with no real follow-up action.** One editor put it like this: "Why is it so hard to get operating people to do things that can't help being good for them? You tell them about a terrific budgetary control plan, for example, and they nod their heads and say 'yeah, that sounds great—just about what we're doing in our plant.' Yet, when you see what they are doing, you find it isn't the same at all. They're just kidding themselves."

This kind of kidding may inflate your ego, but from seeing many sad experiences we know it's dangerous.

• **The "bull of the woods" is still a problem.** He is the character who thinks noise and table pounding and the proverbial red-hot poker are all you need to control costs. If you are inclined to agree, take a look at this thoughtful comment by a good manufacturing manager. "As far as we are concerned, the day of yelling from the front office is gone. It may help your lungs, but it doesn't produce results. Sure, you may get an order from your boss, but then you have to translate it into language your subordinates can understand. 'Cut costs' may mean firing a man you have had in the job for 10 years, or pushing happy old-timers into new jobs they don't know or won't like, or fighting with the union. As the manager, you have to put yourself in the shoes of the supervisor who gets the blood on his hands. He's your real target."

• **A good procedure doesn't guarantee good results.** We're well past the day of the so-called "efficiency expert," who tried to solve all his problems with forms and procedures. The good cost engineer knows that a certain amount of paperwork is essential. But he keeps it to a minimum. He knows that the real key to success is using *all* of his engineering skills and experience in analyzing the total problem.

So, when you take *your* look at cost engineering, we suggest you keep the pitfalls in mind as well as the opportunities. That way, you'll get results.

This is MIKE MAYNARD, "Mr. Work Measurement."

In these photos (and pages that follow) he's talking about . . .

YESTERDAY . . .

TODAY and . . .

TOMORROW in . .

WORK MEASUREMENT

BACKBONE for today's management controls is work measurement. That's yesterday's story. Today's fact: Some form of work measurement can help boost productivity in any kind of manufacturing operation. Forecast for tomorrow: Plant operating managers will be using more work measurement than ever before.

That's how Mike Maynard sees the past, present, and future of work measurement as outlined in this exclusive FACTORY interview.

Harold B. ("Mike") Maynard has quietly established himself as the international authority on work measurement. He's an engineer's engineer—meticulous, unobtrusive, dedicated. He's a manager's manager—effective, realistic, far-sighted. These qualities have earned him this tribute from Dr. Lillian Gilbreth: "Mike Maynard is the leading management scientist of our time."

Mike is inseparably identified with work measurement. He's the originator of the term "methods engineering." With Lowry and Stegemerten he has written such classic texts as *Time and Motion Study and Formulas for Wage Incentives, Operations Analysis,* and *Guide to Methods Improvements.* He is the editor-in-chief of McGraw-Hill's *Industrial Engineering Handbook.*

Mike is probably best known to plant operating men for his pioneering work with predetermined elemental time standards—specifically, Methods-Time Measurement. With others, he has also developed such predetermined time systems as Universal Maintenance Standards, Universal Office Standards, Unified Standard Data.

Mike Maynard's honors are too long to list. He holds the Gilbreth Medal from S.A.M. and the Wallace Clark Award from the Council for International Progress in Management. A.S.M.E. has awarded him the Melville Medal and chosen him as a Henry Robinson Towne lecturer. Mike has been an S.A.M. national president, chairman of the management division of A.S.M.E., presiding officer of the International Management Congress, vice president of A.C.M.E., and an expert consultant to the Secretary of War.

From a simple beginning as a time-study engineer with Westinghouse in 1924, Mike has expanded his valuable experience in management practice, research, and education into one of the largest consulting management firms in the world—H. B. Maynard & Company, Inc., Pittsburgh.

Originally a mechanical engineering graduate of Cornell, Mike now holds a doctor of laws degree from the University of Miami. He is the author of over 200 technical papers. Currently he is directing his efforts toward broader management areas than work measurement. He is editor of the forthcoming *Top Management Handbook* (McGraw-Hill Book Company, Inc.).

Turn the page

MIKE MAYNARD (photo) believes work measurement is the foundation of management control. Here, in this FACTORY interview, he tells how scientific management has refined the task of measuring work.

Begins on page 60

How Work Measurement Got Its Start

WORK MEASUREMENT has its roots in Frederick W. Taylor's original conception of scientific management. Before you can control, Taylor said, you must be able to measure what you want done. The first 30 or 40 years of scientific management were devoted to this basic effort: making measurements simple and accurate.

PROGRESS: TIME STUDY TO MTM

Taylor is recognized mainly for his work in time study and wage incentives. But today's scientific managers should note that although Taylor didn't emphasize it in his work, he was just as methods-conscious as anyone. It was Frank and Lillian Gilbreth, of course, who put most of their emphasis on methods and motions. They were led into this challenging field because they were quick to recognize that time was directly affected by the method used. It was when the work of Taylor in time study was combined with the work of the Gilbreths in motion study that time-and-motion study came into its own.

This time-and-motion study technique of scientific management became the backbone of industrial engineering and became widely used for measuring and controlling direct labor costs.

Note that time-and-motion study is a measurement technique. Since it was used to measure the largest variable in manufacturing costs, it created a position of great importance for the industrial engineer. It is because of his dedication to measurement that the industrial engineer today reaches out so far into all spheres of management, planning, and control.

As pressure developed on the part of both management and labor to extend work measurement (and with it incentive payment) to low-volume work, standard-data and time-formula procedures were developed. These procedures made this extension economically feasible. They also made it possible to establish accurate and consistent time standards without actually timing each individual job. The division of work during the early periods of industrial engineering into minute elements may be attributed in part to the desire to collect and apply standard data. But it soon became obvious that standard data acquired from actual studies were limited in many ways and almost always were expensive.

The limitations of standard data and the pressure for greater coverage on non-routine jobs supplied one of the incentives for the development of predetermined time standards in 1942.

The story of their development has been told many times. I will not dwell upon it here except to acknowledge the contributions of my colleagues, Gus Stegemerten and Jack Schwab, and of the Westinghouse Electric Corporation. MTM also owes a great debt to the Gilbreths. In developing this technique, Stegemerten and I started out using the Therblig analysis. There's still a great similarity between Therbligs and the basic motion elements in MTM.

The reception to predetermined time standards (and I will refer to MTM simply because this is the system that I have been most closely associated with) was varied at first. It ranged from enthusiastic acceptance to strong resistance. But experience has proved time and again that when properly applied, MTM is actually more accurate than direct measurement. It is simply unrealistic to say otherwise.

The problems in applying details of MTM may have bothered some technicians, but they did not bother management, who saw from the start the benefits that MTM offered. And, parenthetically, this may be why so many industrial engineers have trouble selling a new technique to management. They miss the point that management is not interested in techniques so much as in the solution of problems.

Except for refinement in techniques, we're still time-studying jobs the same way Taylor did in 1900. Taylor broke down a job into its elements, measured the time needed to perform them, then added an allowance. Probably the only area he did not pioneer in—although he certainly explored it—was that of performance rating associated with time study.

REFINEMENTS SHOW UP

When I first joined Westinghouse in the early 1920's, the adjustment of raw time-study data in accordance with the performance given by the worker who was being studied was accomplished by the percent selection method. In effect, this was simply a listing of the stop-watch times for an element in ascending order of magnitude. The time-study engineer used his judgment as to how well the operator was working. He went down the column of figures and selected the most representative one according to its position. He chose the times at the slower end of the scale if the operator studied had worked at a fast pace; those at the faster end of the scale if a slower performance had been observed.

While this primitive method of adjusting for operator performance worked out fairly well in practice, it was pretty nearly impossible to validate in a serious work. Gus Stegemerten and Stew Lowry invited me in 1924 to help them write a book on time-and-motion study. We thought we had the answers to all steps of the time-and-motion study procedure until we tried to describe the procedure for adjusting for performance level. Then we saw how unscientific the percent selection method really was. We stopped writing, and Gus Stegemerten and I spent a year on research. This led to the development of the leveling method of rating and adjusting for variations in performance level above and below average.

We tried to pin down these factors: skill, effort, conditions, and consistency of readings. As the result of these studies we developed what we know today as "leveling" factors. When we published a description of the leveling procedure, King Hathaway, an early associate of Taylor, said, "Now time study is complete."

ERRORS CREEP IN

Work measurement spread rapidly throughout industry from about 1917 on. Unfortunately it was often carelessly applied—incompetently during the efficiency-expert era of World War I, then too hurriedly during World War II.

This faulty application was accompanied with difficulties in administration. Thus the usefulness of work measurement as a helpful tool was often impaired.

All the pioneers in scientific management recognized the importance of developing effective work methods before undertaking work measurement. But there was a long period of time when the people who followed the earlier pioneers (like Taylor and Gilbreth) were entranced with piece rates, time study, etc. So they pushed methods study into a corner. Remember, results in the early days were so easy to get that the engineer needed little else as a persuader than to say, "I'll pay you more if you produce more."

This lack of sophistication and engineering knowledge on the part of the time-study man resulted in loose standards and runaway earnings as the workers developed improved methods themselves. It also led to all sorts of evils (such as rate cutting).

Happily, as time study came of age and as its practitioners became primarily engineers, industry began to pay more attention to the methods before it undertook to set the standards.

Turn the page

"Many industrial engineers have trouble selling a new technique. They miss the point that management is not interested in techniques so much as in the problem solution."

"It's surprising to me that so many companies are still using wage incentives without work measurement. This really represents poor management." So says Mike Maynard as he analyzes work measurement today.

Begins on page 60

How Work Measurement Looks Today

GREATEST OBJECTION to work measurement, yet actually the least defensible, is the cry: "Our work is different."

FACTORY's own study ("The Truth About Work Measurement and Wage Incentives Today," April 1959) shows that work measurement is being applied now, with or without incentives, to most kinds of direct-labor operations in American industry. The careless and hasty installations of the past are being gradually corrected. Correction is always painful. Good work-measurement programs are built on careful, thoughtful, tailored installations. There rarely is an "easy" way.

Incidentally, FACTORY's survey was a surprise to me in that so many companies still use wage incentives without work measurement. This really represents poor management. To attempt to control labor costs and to compensate for cost without first measuring worth is like buying a pig in a poke every day.

NEEDED: BROADER APPLICATIONS

Even today, there is much confusion about what work measurement really is. It certainly must be much broader than time study. It should be applied at any level of the organization and to any kind of work. And it may be accomplished by a variety of techniques. On the other hand, I would think it dangerous to consider plain estimating as work measurement.

I am not surprised that people interpret work measurement in different ways. The whole terminology of industrial engineering is confused. The American Institute of Industrial Engineering, even now, is struggling with a definition to describe just what an industrial engineer does. When the industrial engineer talks of work measurement, he, most of all, should take the broad approach. Each valid measurement technique can be only a part of the whole. The competent industrial engineer needs all the techniques—from basic stopwatch reading to operations research.

My view about work measurement today is this: If 60% of the plants in America use it to advantage, then the other 40% are missing the boat. Why don't they use it? Either of two reasons, I guess. Poor management or union resistance. But management is by far the more responsible party.

NEWEST TARGET: MAINTENANCE

While I may be accused of being prejudiced, I think it's fair to say that predetermined motion-time systems are increasingly being recognized as a superior form of methods-improvement and work-measurement technique. Everywhere we see increasing applications of work measurement. But the big targets today are in maintenance and in clerical work. I believe that the most rewarding area now is in this indirect field. Our organization, as you know, has developed UMS (Universal Maintenance Standards) and UOS (Universal Office Standards) to serve in these areas.

Up until the Depression, time-and-motion study was pretty well confined to direct-labor repetitive operations. Direct labor was easier to measure, since it was highly repetitive and reasonably simple to supervise and control.

Many of these repetitive operations were performed by hand. There was an assumption—not founded in fact—that the measurement and control of direct labor would yield higher rewards than that of indirect workers. As more and more direct workers were offered wage incentives that were based on standards, the pressure for incentive coverage began to come from the skilled indirect workers themselves. They, too, wanted the opportunity to earn more money.

And, don't forget, there were then (and still are today) many non-repetitive direct-labor jobs. When I went to South Philadelphia in the mid-20's, the average quantity per order going through the shop was five pieces. And there were many one-piece jobs, too. Industrial engineers had a lot to offer to such a shop—not only in measuring work so that incentives could be applied—but also in establishing some sort of standards of performance for control.

Today we are doing a great deal of measurement of indirect work, especially in the field of maintenance. We find in our work a great many maintenance groups working at 50% efficiency. Just making standards available to maintenance supervision will often cause efficiency to improve up to 85 to 95%. Improvement will depend largely upon the quality of supervision and the state of human relations in that shop. With wage incentives added, efficiency will ordinarily rise as high as 120 to 125%.

This is the wonderful thing about work measurement. You can go part of the way with measured day work. Or you can go all the way by adding wage incentives to the established standards.

SOMETHING OLD, SOMETHING NEW

My attitude toward incentives is one of acceptance—the best from the past, the best from today. When I ran my own manufacturing company during World War II, I paid incentives because I thought they were good. I still think wage incentives are a good thing—when properly managed. But there's little doubt in my mind that so much evidence (as there is today) of high or inconsistent incentive earnings indicates an alarming incidence of loose rates. On the other hand, I interpret low incentive earnings to mean that a plant probably has a human relations problem.

Too many people today are ready to write work measurement off for a newer technique. But there will always be many worthwhile opportunities for using our basic measurement tools. Even in automation, work measurement can be helpful. Predetermined time standards are especially useful for establishing standards for repair and maintenance of an automated line. But, obviously, the newer techniques, too, like operations research and its waiting-line theory, will find application here. I think the industrial engineer should have all of them in his toolkit.

There's also a dangerous tendency, I think, to consider work measurement as old hat. Many universities would like to drop courses in time-and-motion study for statistical and operations research courses. This seems short-sighted to me. It overlooks Taylor's wonderful observation: To control you must first measure. This means observing the work, developing an effective method, training the worker to use it, and establishing a standard time for doing it, which is beyond the scope of mathematics.

The advent of automation and computers is causing some people to feel that these techniques, rather than methods improvement and work measurement, are the answer to cost control. We must guard against premature acceptance of this as a fact. We are likely to make a serious mistake if we throw out the simple, proven methods before we have learned how to apply the newer, more complex ones.

By and large, however, a sound work-measurement job is quietly being done by a large body of industrial engineers. These are the solid men who keep their eyes on new techniques, but who do not abandon the old as long as they are useful.

As we come to the close of this era I get the feeling that management, unions, and workers are learning to accept the inevitability of change. Apparently the much greater emphasis placed on good human relations during the last two decades is finally showing results. Maybe I am a little too optimistic, but even though many unions throw roadblocks in the way of improvement, today's management is doing a better job in handling these problems.

We in the work-measurement field owe a debt of gratitude to the unions. While day by day they have often appeared reactionary and difficult, it's obvious that in many cases unions have provided the force and the motivation to see that jobs and work are measured. Yet I still think that the greatest tragedy of all takes place in a company where the union's philosophy is to hold down the amount of work to be accomplished. Such an attitude, generally accepted, would hold down our whole society.

Turn the page

"Too many people today are ready to write work measurement off for a newer technique. But there will always be many worthwhile opportunities for using our basic measurment tools in the search for efficiency."

"Right now in our company," says Maynard, "we are investigating electronic ways of measuring human performance in groups objectively. This area invites further exploration."

Begins on page 60

Where Work Measurement Is Headed

REGARDLESS of hysterical guesses to the contrary, plant management will have lots of work measurement in its future. Work measurement will always be useful on non-automated processes, which we know will continue in large volume in many industries. Many industries that will produce in greater quantities will also continue to do so with human labor.

By no means all the engineering industries (such as machine tools, heavy fabricating, and aircraft) will reach the automated state in the predictable future. Even assuming tremendous steps in manufacturing techniques, many industries will not achieve the greater volumes necessary for automation. And there will be few plants in the future that will not face the age-old problem of "specials" and "job lots."

MORE FORMULAS, MORE COVERAGE

In the next 10 years greater use will be made of standard-data and time formulas. Standard data (compilations of elemental time data in charts or tables) usually require the analyst to think through their application and select the data he needs. But time formulas think through the application process in advance and arrange the data in algebraic or mathematical models. Both enable the engineer to set standards without watching the job performed.

We mustn't be misled into believing we can sit in an office with our standard data or time formulas and measure work and set standards without personal contact between the standard setter and the people who do the work. This has been tried and found dangerous.

Regardless of how far we go in the use of standard data, the most important ingredient will always be a close relationship between engineer and workman. Otherwise the engineer will tend to become unrealistic because he simply won't know what's going on in the shop. Going too far along the road to routinizing the standard-setting process is dangerous, for there will inevitably be a drift in methods. Changed conditions take place. And the result is loose rates.

There will continue to be practical limitations on the use of predetermined elemental time standards. They are applicable only to manual work that is under the control of the worker. They will not measure process-controlled elements.

More companies in the next 10 years will approach 100% coverage of direct and indirect labor operations. While the last one or two per cent are hard to reach, many managements stop far short of an economically justifiable goal. In my opinion and experience 100% coverage is not only possible, it is also often profitable. But as FACTORY's survey shows, many companies haven't scratched the surface.

MORE COMPUTERS, NEW TECHNIQUES

Computers will be used in establishing standards. This way, much analytical work will be simplified.

The great interest that management has shown in computers is the best evidence I know of management's hunger for more measurement—and for more and more facts to improve decision-making. In many ways it's pathetic that companies gaily buy these expensive com-

puters without knowing quite what they are going to do with them. It will remain for the industrial engineer, the work-measurement expert, to show how to apply these machines properly in many different ways.

Statistical and operations research techniques, too, will increasingly find a place in the industrial engineer's toolkit for certain kinds of work measurement. The industrial engineer who cannot master these techniques will not be able to solve certain kinds of problems. Likewise, the industrial engineer who relies too heavily on these techniques will falter. But he needs to keep abreast of developments and results in this area with the same dedication that a doctor would in the science of medicine.

COMING: BROADER APPLICATIONS

During the past 50 or 60 years we've thought of work measurement as applying largely to factory labor. Now we're witnessing the beginning of a trend to apply some form of work measurement to higher-level jobs including engineers, accountants, and even management itself.

Let's take engineers. Our studies made to relieve engineering shortages show often the same kinds of problem in the engineering departments as in the shops. For instance, in one company we found engineers using 39% of their time in conferences trying to get information. This unproductive activity was eliminated by better work organization.

How do you measure creative work? That's a tough one. But much of what we call creative work is merely thinking through known procedures. We can measure the time for this—for example, the time needed to design a foundation for a building. We can do this by developing various classifications for engineering drawings based on line and lettering count. With this information available, the engineering supervisor can set standards that help him plan and schedule the work of his department effectively. At the start these measurements may be rough, but I believe they are a lot better than no measurements at all.

The new work-measurement techniques will follow the old pattern of studying the method, establishing the best method, measuring the time element, and measuring the value element. We will see increased use of direct observation, as employed in work sampling.

The new methods will include improvements such as group timing techniques. This is a recently developed method that combines the stopwatch observations with statistics. It makes possible the simultaneous time study of groups of workers up to 15 in number.

Other techniques we'll see more use of are linear programing, master training concept, methods engineering, operations analysis, MTM, operations research, work sampling, and the profit survey or audit. Some of these are fairly new, some are old. We certainly don't want to belittle the new developments. But we shouldn't neglect tried and tested procedures that we have applied so well in the past.

New creative approaches to the measurement of hitherto unmeasurable factors will be increasingly tried. An example of this is the work of the General Electric Company in developing the Employee Relations Index, which attempts to take objective statistical data and translate it mathematically into a measurement of the level of a work group's morale. Right now, in our company, we are investigating electronic ways of measuring human performance in groups objectively (photo). This area invites further exploration.

COMING: MORE MANAGEMENT PERCEPTION

I think all this adds up to the fact that management at all levels is beginning to recognize the connection between measurement and the planning, directing, and control functions. The industrial engineer must never lose sight of the fact that the whole point of measurement is not for measurement itself, but for control.

In looking to the future we should keep in perspective the fact that we haven't done half the job we should have done with the old techniques. If we take action with the same kind of mental attitude as we have in the past, we won't do half the job we should with the new techniques.

If you don't use measurement, you're not practicing scientific management. Measurement needn't mean measurement of time alone. There are all sorts of measurements—of material, yield, money, productivity, input and output, morale, attitudes.

Take a maintenance job, for instance. Sometimes in our measurement studies we find two men taking two weeks to do a job they ought to do in two days. The precise measurement of time needed in such a case is not nearly as significant as the wasted time and effort that the study has revealed, indicating as it does the need for a complete revision of existing maintenance management methods.

BIG FACTOR—THE HUMAN EQUATION

Improved skills in handling human relations and the stepped-up education of both management and labor will speed the universal acceptance of work measurement as the only fair basis for evaluating performance at all organization levels.

Surprisingly, a large part of the work-measurement problem is a communications problem. Employees want communication. They don't always get it. Industrial engineers, for some reason or other, have been notoriously poor in this skill. Traditionally they have leaned on the "I'll tell you" technique. It's the old story of the stonemasons again and again. One stonemason says he's working for $10 a day. A second one says he's laying stones. And a third one says he's building a cathedral. Too many work measurement technicians still tell their story in terms of $10 a day.

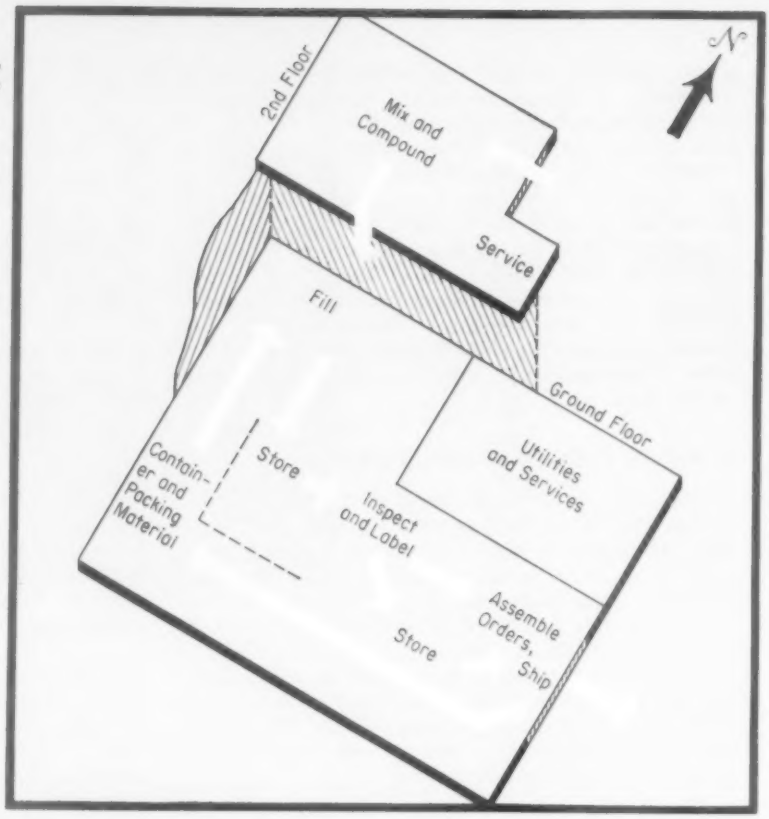
Human factors are important, and we need greater skills in interpreting and allowing for them. But we should not think that desire alone guarantees efficiency. We shouldn't minimize the importance of knowing what to expect of people and what to ask of them. It is lack of sound standards that causes management most of its troubles.

Finally, some people wonder why the industrial engineer is so often promotable. They forget that he typifies the analytical and engineering approach. A man who can analyze and measure can move into other management fields needing similar skills.

"Best" layout—it considers everything

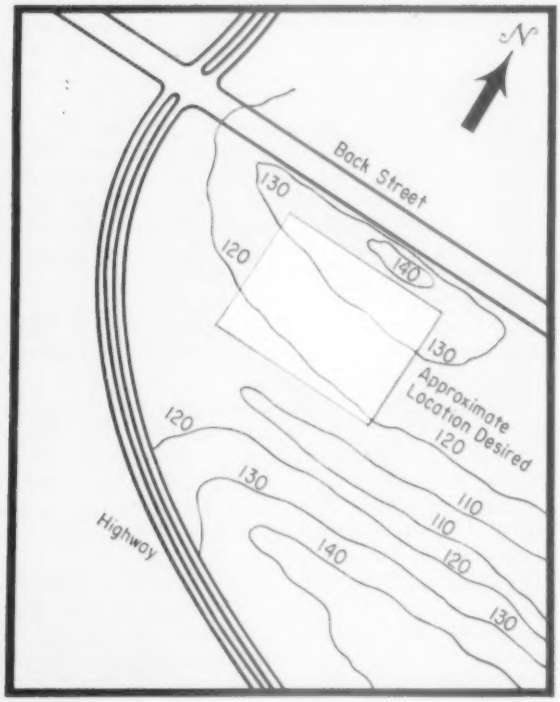
Not perfect. No layout is. But for the conditions specified for this plant it's the best compromise. It's based on all the following principles for efficient layout:

1. Keep activities that are similar (in function, building needs, etc.) together, thus increase utilization of space.
2. Avoid physical or structural barriers, thus improve flexibility.
3. Keep buildings compact.
4. Keep at least two sides of an area or activity open, thus eliminate congestion.
5. Avoid small clusters of workers, which boost labor costs, make supervision inconvenient.
6. Integrate utility areas and services, make them adjacent, thus improve operation.
7. Avoid locating activities where they require special features that raise building costs.
8. Avoid strung-out activities that complicate access to and within the activity or area.

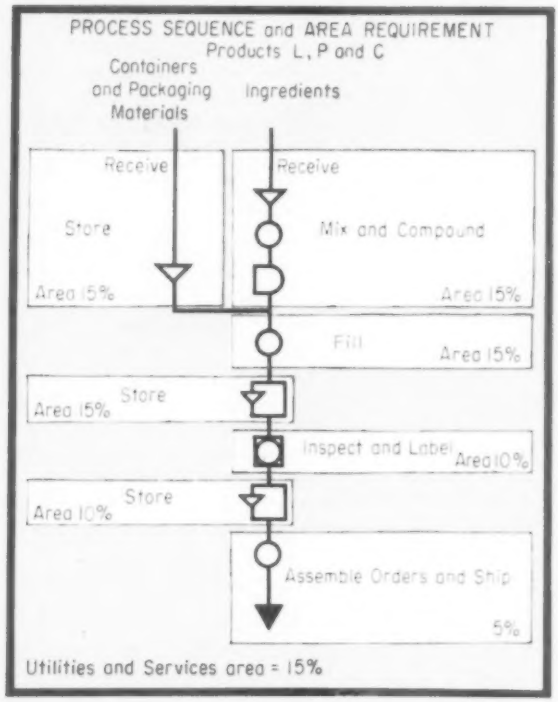


This plant layout, says Author Muther, is the best of several for...

...this plant site ▼



...and this process flow ▼



The plant layout on the facing page is the fruit of some sharp management decisions. Not perfect—but the best that can be designed for this site, this process flow. For eight ways to go wrong with the same site and same flow, see pages 70-73. But before you go on, read here how Author Muther developed this "best" layout. He'll guide you in . . .

Getting Your Best Plant Layout

EVERY PLANT LAYOUT is "wrong." Wrong in at least some respect or some detail. That's true even of the "best" layout for a given site or process (see facing page).

This is a provocative statement. But true. As professional management and industrial engineers, we (Richard Muther & Associates) can go into almost any plant and find some shortcoming in layout.

But this statement doesn't upset the experienced layout man. He knows that every plant layout is a compromise in some degree. And he knows that he has to accept some disadvantages to get advantages that are more important. When all the planning is done and the layout is installed, the proof of the pudding is in its total operating result.

Even so, plant operating managers can avoid many common mistakes in layout. In the pages of this article you'll see several ways to lay out a given plant. The first layout, on the facing page, is the best. The next eight, on the following pages, include some serious but typical errors.

What this plant needs—The plant we're concerned with here is a new one. It's small—only 50,000 square feet. It's a manufacturing plant and warehouse only. There are no administrative or sales offices to consider in planning the layout.

By RICHARD MUTHER
Richard Muther & Associates, Kansas City, Mo.

This plant is to be built on a site already selected. In fact, because of highway conditions and slope of the site, the approximate orientation on the site is pretty well established. That is, access from Back Street is set—for all except visitors—because it's not desirable for truck docks to face the highway. A two-story, split-level building makes sense in this instance because of the way the land slopes upward toward Back Street.

Products of this plant will be pharmaceuticals for animals. The manufacturing process is typical of many products that require smooth flow for mixing, filling, and packaging.

This plant will turn out three basic categories of products: liquids (L); powders and capsules (P); and another line of products—both liquid and powder (C), which would contaminate the others by air-borne contact. C products therefore must be enclosed or segregated from L and P products during mixing and filling operations lest these latter be contaminated and have to be destroyed.

If this plant were your problem, how would you locate production, storage, receiving and shipping, utilities and services? Look at the best compromise on the facing page—the layout that considers everything. Then on the next four pages, you'll find eight common mistakes that might have been made in laying out this plant.

Turn the page

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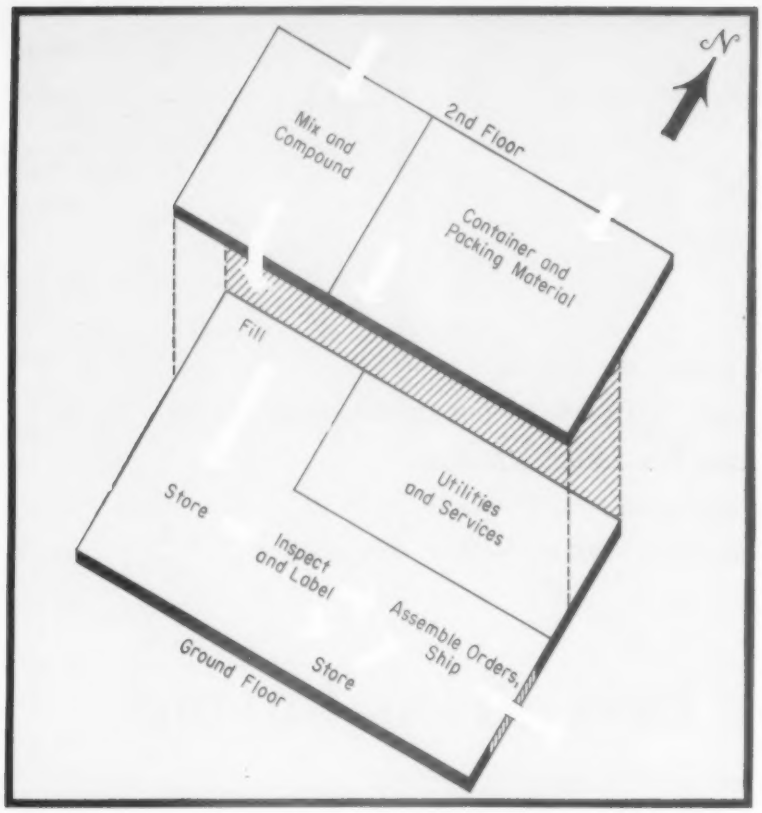


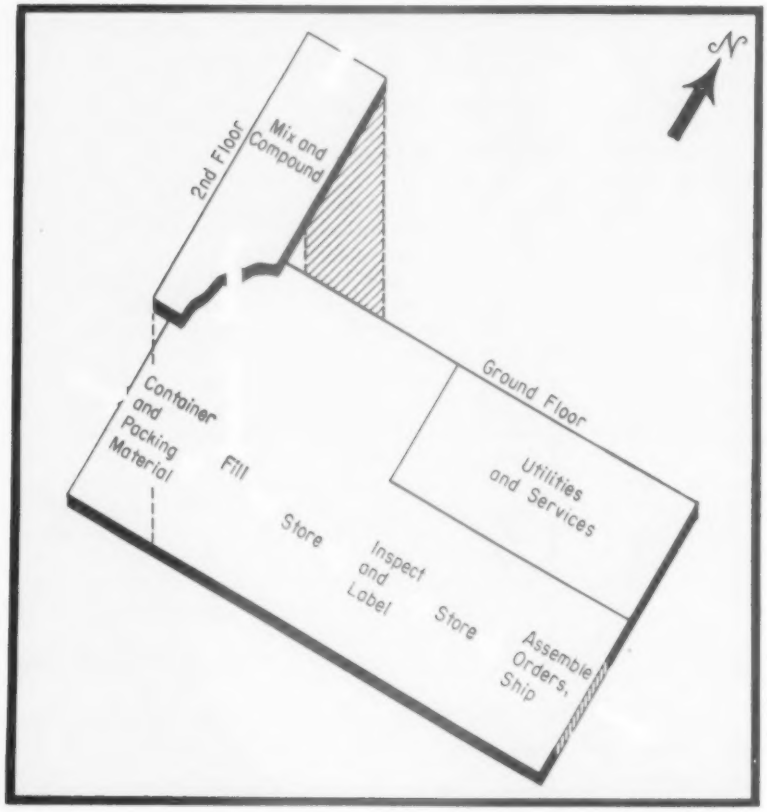
Begins on page 68

Mistake 1—Plant Space Wasted

The main idea—and a good one—in this layout is to feed both product and containers in at one point and out at another. Mixing and compounding are on the second level. Receiving and storage of containers and packing materials are on the same level.

But the layout wastes space. Storage areas for containers and packing materials are separated from the other storage areas. This way, materials can't be shifted from one area to another as inventories go up and down. Also there's waste of overhead space. Overhead space for storage must be higher. Areas for mixing and compounding and for filling and inspecting-labeling don't need as much height.

Additional limitations: need for lift trucks on both floors; probable need for elevator; receiving on two different floors.



Mistake 2—Little or No Flexibility

This layout has a good material flow. It has north-south distribution in mixing and compounding on the upper floor and a clean, smooth west-east flow on the ground floor.

But the layout lacks flexibility. Storage areas are divided by "filling." Results: The space on either side cannot be adjusted to balance storage loads. What's more, the expansion possibilities on the second level aren't as good as they might seem. Mixing and compounding requires relatively fixed equipment installations. An extension of the second floor would require costly roof and structural changes.

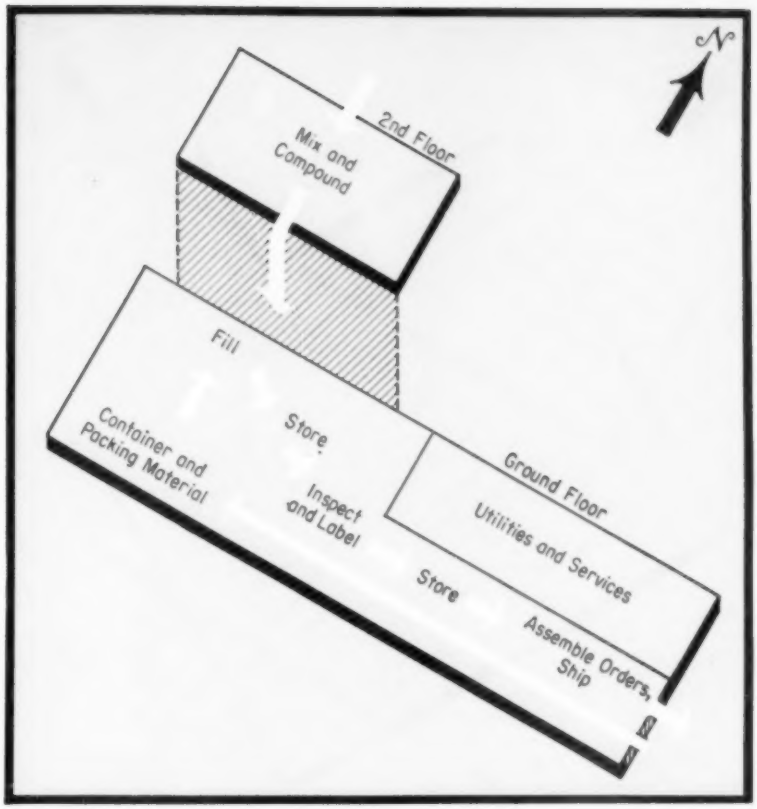
Additional limitations include a truck dock on the west wall—toward the prevailing wind. Dirt will blow in here, and that's a serious problem for this plant. Also the plant should put its best appearance westward, toward the highway.

Mistake 3—Too Many Long Moves Needed

This layout is based on a "U-shaped" flow of material. Containers and packing materials are received at the east dock and moved directly into storage. Receiving (except for mixing ingredients) and shipping departments are combined. The layout would lie nicely along the contour of the land.

But the layout requires long hauls of containers and packing materials. From the dock they move almost all the way to the west end of the building.

Also, the long, narrow route back through inspect-label, store, and order assembly would limit the use of the space and lead to further extra handling. If material flow followed a general path across the short dimension of the building, it wouldn't be bad. But in this layout the general flow of materials follows the long dimension.



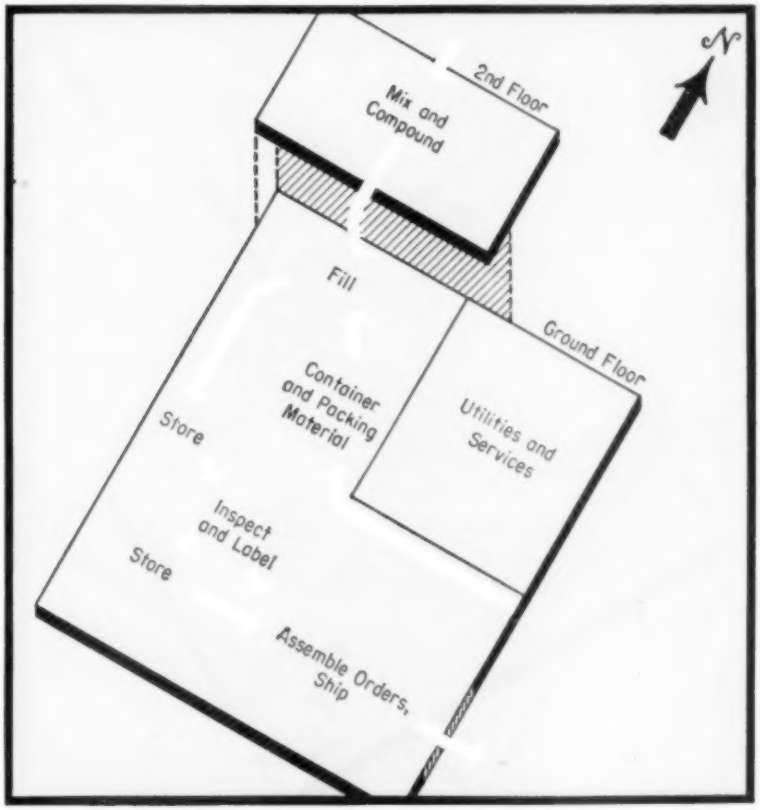
Mistake 4—Space Badly Jammed Up

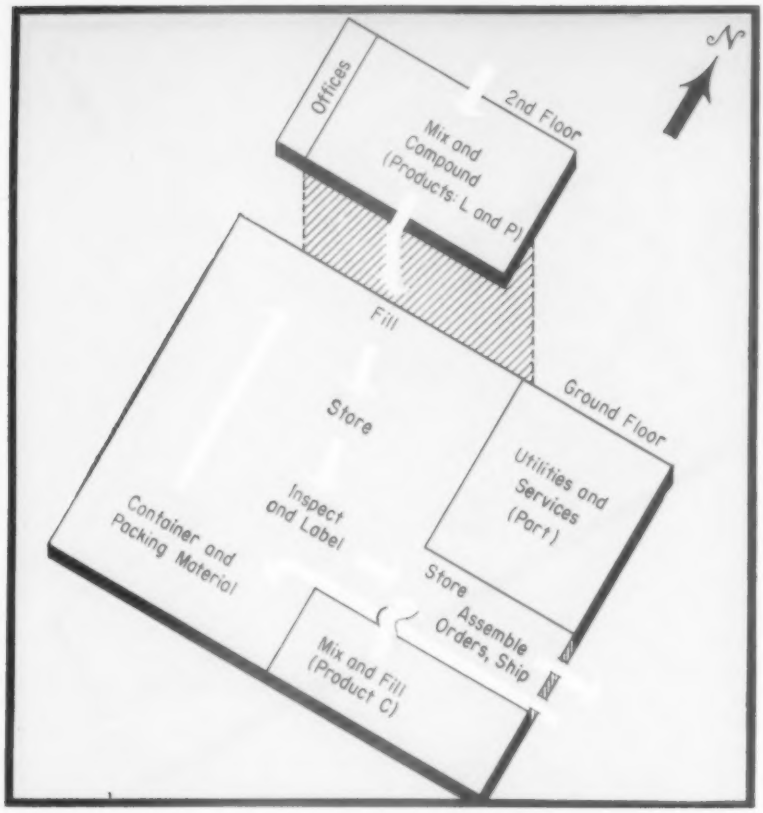
This layout is the reverse of No. 3, just above. It tends to make the building configuration long in the direction that's perpendicular to the slope of the land. This way, it has the advantage of reducing handling distances.

But the layout jams its space. In the effort to reduce handling distances, utilities and services are crowded around the filling area. Storage and handling of containers, before and after filling, are similarly squeezed. This squeezing comes from the need to give filling-area access to workers and materials.

In addition, construction cost and cost of site improvement will be higher. The building will stretch well out into the valley in the center of the site.

For more mistakes commonly made in plant layout, turn the page





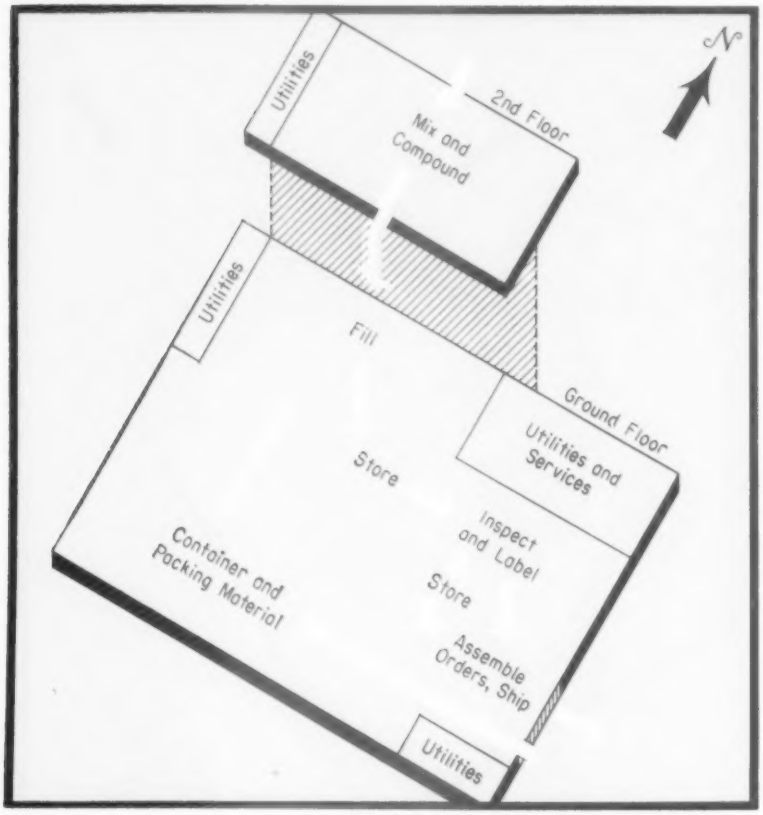
Begins on page 68

Mistake 5—More Men, Loose Supervision

This layout physically separates the mixing and filling of Class C products from Class L and Class P products. It eliminates the possibility that C products will contaminate L and P products and thus increase spoilage costs.

But this layout leads to increased labor costs and inconvenience to the supervisor. Workers in the same job category are split into widely different areas. They cannot move readily from one job to another because of the long, time-consuming distances involved. The supervisor must cover more ground in the plant to check work for which he is individually responsible.

Additional limitations caused by this layout: duplication of some equipment for handling with manufacturing; traffic cross-flow in storage areas; offices removed from the center of activity.



Mistake 6—Inefficient Utilities, Services

This layout splits the plant's utilities and service areas. These areas include such things as cold-storage room, compressor, process-steam boiler, lockers, laboratory, shop office, maintenance room, stores, lunchroom, and the like. The layout locates each of these facilities closer to the point of use. That's all to the good.

But this layout builds up obstacles to the efficient use of utilities and services. Splitting utilities and services raises installation costs. Otherwise unnecessary aisles are needed to provide access to utility areas. More work and supervision time are needed to service the areas. Finally, there is less opportunity to balance out area utilization.

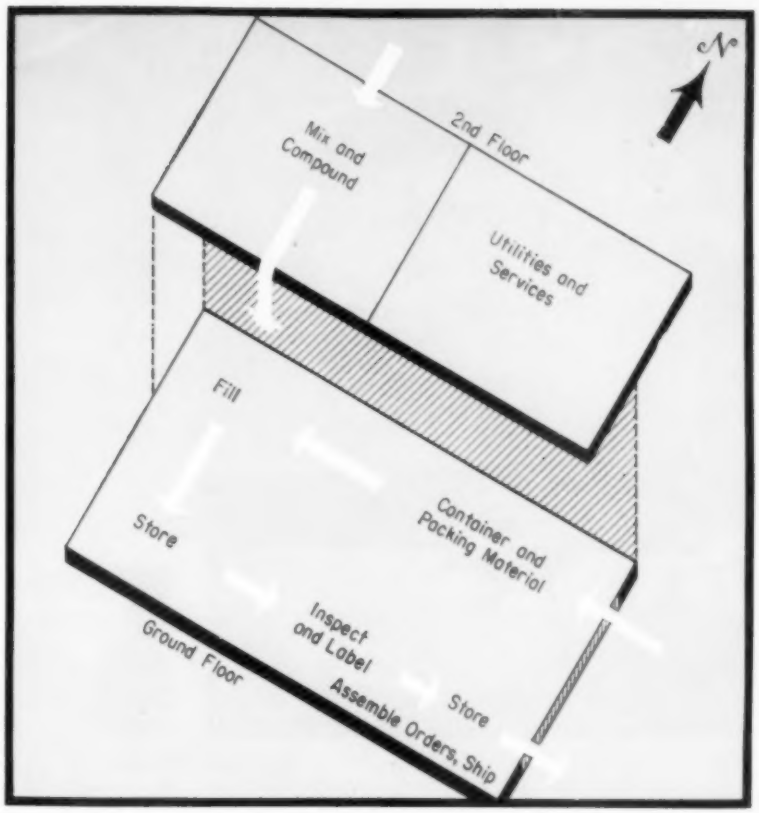
In addition, the layout blocks easy expansion both east and west. It is not a "clean" layout.

Mistake 7—Big Rise in Building Costs

This layout is characterized by smooth flow pattern and high utilization of space. Also it's flexible. It places all services and utilities on the second level. On paper—and at first glance—it is an excellent arrangement, for site as well as for manufacturing processes.

But this layout runs up the building costs. The cold room, the compressors, and the steam boiler are up on the second floor, remote from many of the plant activities. This elevation requires extra insulation and structural strength to withstand vibrations and support the heavy load.

An additional limitation in this layout: The cold-storage room is used chiefly by inspection-labeling and shipping. This inconvenient location could easily be overlooked without a thorough check of the layout with process charts.

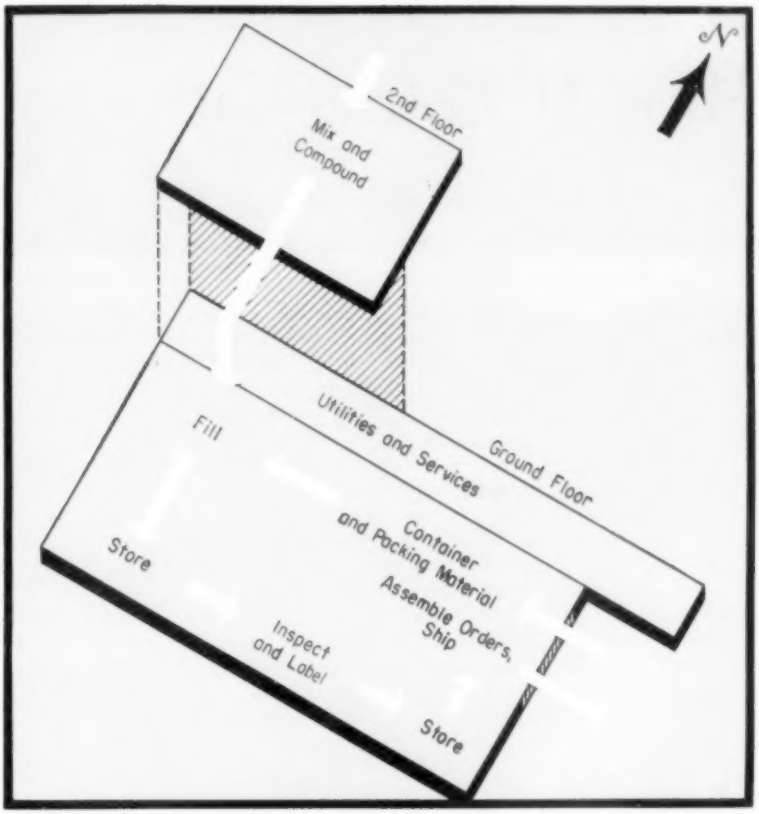


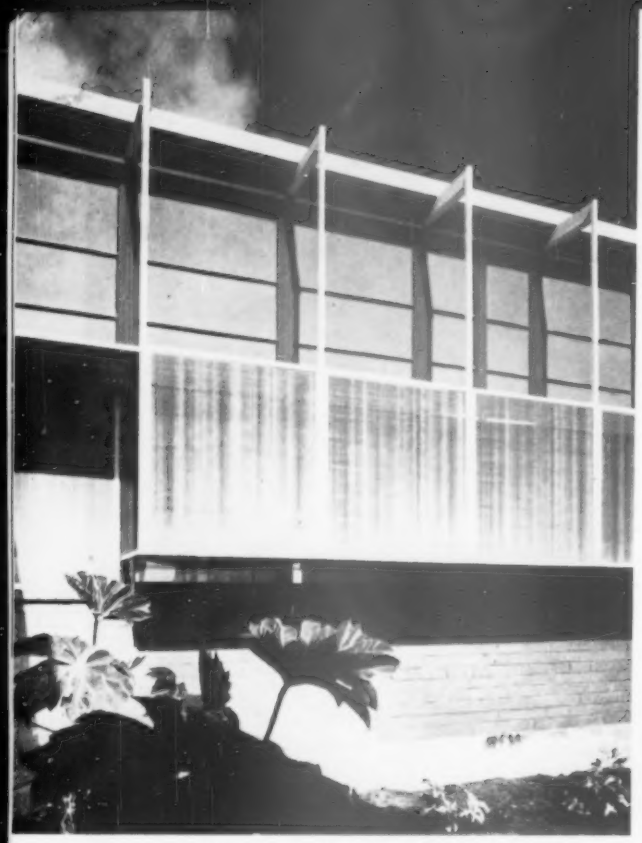
Mistake 8—Poor Accessibility

Material flow and operating space are arranged efficiently. All utilities and services are out of the way of production.

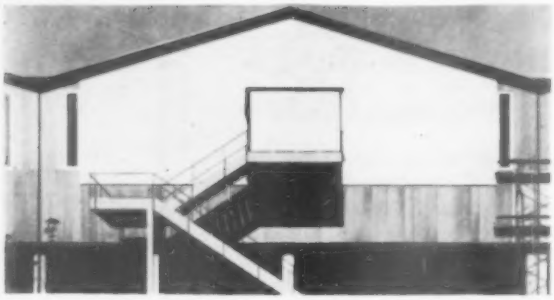
But the layout lacks accessibility and crowds its services. If the cold-storage room is under the second level, it's not readily accessible to inspect-labeling and shipping. If cold storage, along with the compressors, the boiler, and the maintenance shop, is close to the dock, then the laboratory, the offices, the lunchroom are crowded under the balcony. In either case the long, strung-out arrangement reduces accessibility. It demands an access aisle between the utility-service area and filling.

Also the utility-service area would be walled off from the filling areas in this layout. That would create a problem in providing it with an adequate fire exit.





BRONZE LOUVER screening lets light in, keeps glare out. Here, at B-J Electronics Division (Santa Ana, Calif.), Borg-Warner's Koolshade protects plant areas from the sun's beams. Though screen is small mesh, air can get through.



NO LOUVERS at all at Texas Instruments' new Dallas plant. Reflective white marble blocks light and heat on upper floor. Office floor (below) is set back far enough beneath overhang to provide cool, shady outlook from inside.

BRIGHT OFFICES in the Dallas plant get all the advantages of outside sunshine, none of the disadvantages. Only the oblique rays of the late afternoon sun can reach inside. Strong, vertical midday rays are kept out by the 30-ft. setback.

How 11 Plants Cut Cooling Loads

Control sun glare and you clobber air-conditioning costs. That's what these plants are finding out. Bonus benefit: Sun-protected plants look better, too.

EVERYBODY talks about the weather. These 11 plants (photos here and on the following pages) do something about it. They keep hot sunshine outside—where it belongs. And they keep air-conditioning costs down—where they belong.

These forward-looking plants take the most practical approach to control of solar heat. They rebuff the sunshine before it can enter. They use every method from simple shading to elaborate clock-controlled louvering. The photos show how.

In most instances these plants have cut air-conditioning costs enough to pay out the cost of shades and louvers in short order.

In addition to cutting cooling costs, sunshades make a plant look attractive. Many of these plant exteriors would be monotonously simple and uninteresting without the sunshades. But with a little imagination you can get an effect stunning enough to stop traffic.

A good example is the corrugated-container plant of Growers Container Corporation (upper photo, facing page). Here, exterior sun-control louvers give a big boost to the plant's appearance while they solve the problem of glare. Take away the louvers, and the basic building is much like many another you'll find in California. But with the shades the plant is far more handsome than its neighbors. (It's a 150,000-sq.-ft. building with tilt-up walls of reinforced concrete.)

The story of orienting this Growers Container plant on its site is a story of woe. Because of streets and rail sidings, the two-story building had to face west—directly west. Right into the rays of the afternoon sun.

Thus the architects didn't have much scope for imagination. To make the best of this problem they simply faced the building west, gave it a set of handsome glass screens.

The Stuart Company (bottom, facing page) is an example of the dual use of a single material. The delicate, lace-like concrete screen makes a pleasing design and keeps the sun under control, too. (For an exterior view see FACTORY, May 1959, pages 78 and 113.)

FIXED SCREENS of heat-absorbing, glare-reducing glass (with aluminum frames) do double duty for Growers Container Corporation's new plant at Fullerton, Calif. They block the sun's heat in daytime, emit attractive light at night.

EYE-LEVEL cutoff of screens is just the thing for an unobstructed outward view at Growers Container's plant. Placement of storage cabinets beneath windows keeps desks well back from window walls. Counter top makes an ideal workplace.

FILIGREE SCREEN of concrete, made famous by Architect Edward Stone, gives office areas at Stuart Company (Pasadena) an airy look, yet provides barrier to hot sun. Though this office (president's) faces west, it's cool, well shaded.

Turn the page

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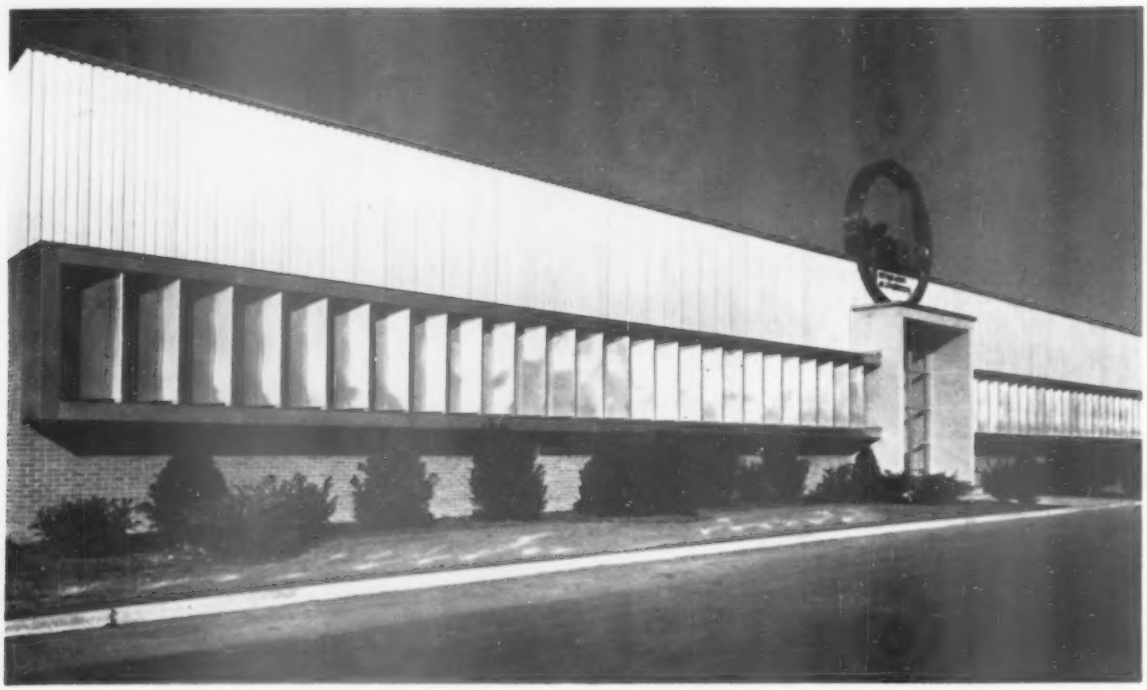
How Today's Plants Control Solar Heat and Glare

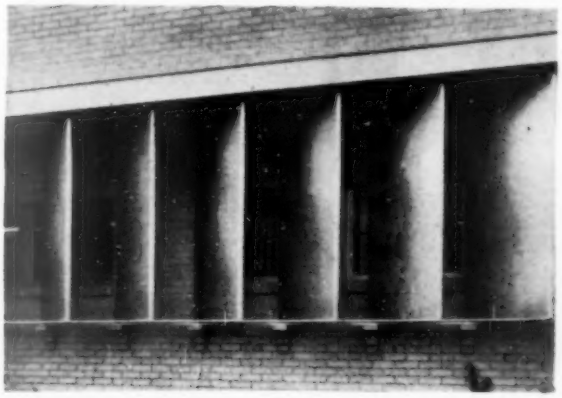


GLEAMING SHADES of aluminum make the Engineering and Research Laboratory of the York Corporation (Division of Borg-Warner) in York, Pa., a stand-out. Low maintenance and attractive appearance of shades such as these have made them a favorite among designers and architects of plants, offices, and laboratory facilities. These shades have a special mechanism, operated from inside the building, so that they can be adjusted for seasonal requirements.

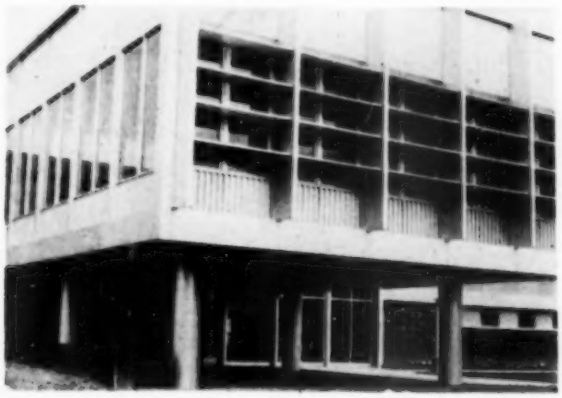
FIXED GRILLEWORK of aluminum at the Gibson Art Company of Amberly Village, Ohio, is called an "eyebrow" shade. It has six obliquely set strips of high-polish aluminum set between I-beam channels to keep windows well shaded.

VERTICAL LOUVERS joined by a series of horizontal members at the top of the window lines keep interior of this plant (Lambert-Hudnut Company, Lititz, Pa.) impervious to sun's rays. Almost no direct rays of the sun can enter.

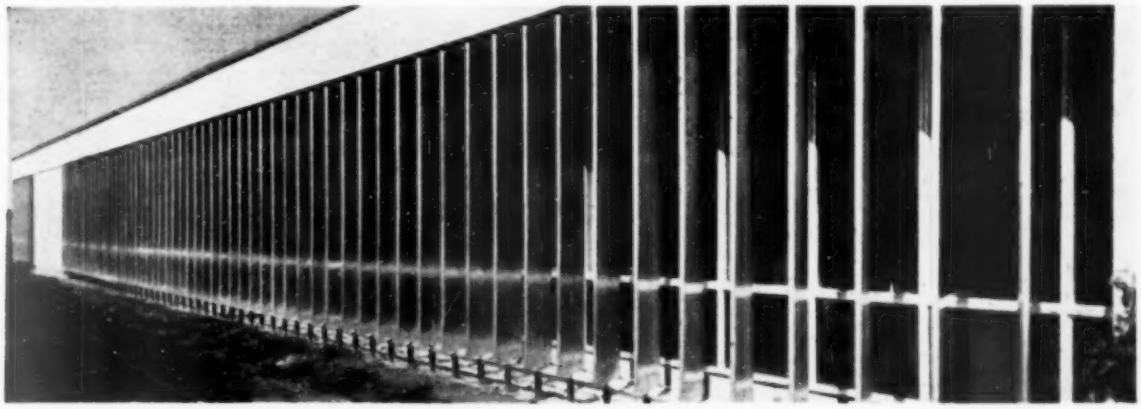
—and Lighten Their Air Conditioning Load



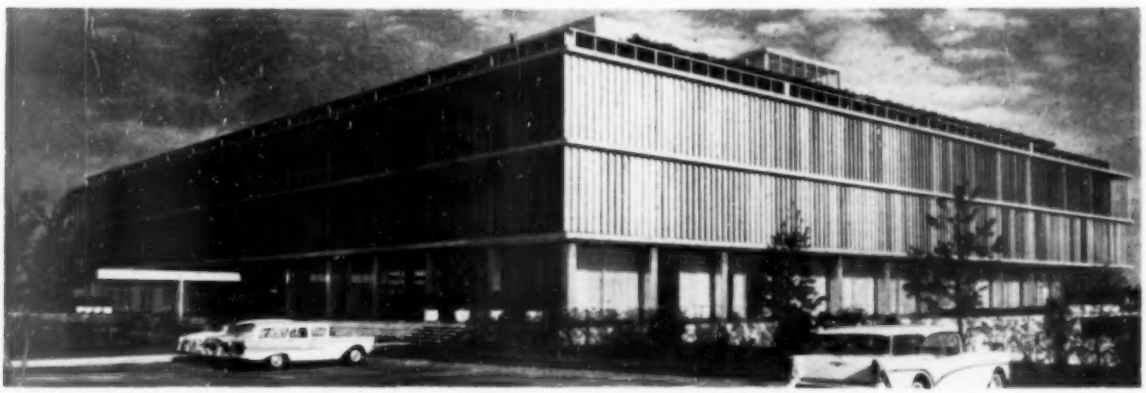
MOVING SUNSHADES combined with an aluminum canopy at this Frito Company branch plant office in Houston, Tex., do effective job of rejecting glare. Interior pivots sit on brick ledges. A simple crossbar device adjusts the setting.



TILTING VANES that are horizontally anchored to vertical louvers shade the administration at the Ravenswood (W. Va.) Works of Kaiser Aluminum & Chemical Corporation. Vanes are easily adjustable from inside the building.



MOTORIZED LOUVERS cover the entire sunny side of the office wall of the Toilet Goods Plant, Procter & Gamble Manufacturing Company, Iowa City. One station controls office louvers as a group. Another handles cafeteria vanes.



AUTOMATIC CONTROL of this complex system of louvers keeps Reynolds Metals Company's Richmond (Va.) headquarters comfortably shaded at any time of the day, month, or year. A master celestial clock computes seasonal changes, keeps louvers slightly ahead of sun's movements. Thus building always gets the maximum view and maximum natural light. Leaving nothing to chance, Reynolds's new system also has a series of photoelectric cells that overrule the clock on overcast days.

1. Measure your man

2. Ask for an answer

3. Agree on the fee

4. Settle some subjects

5. Reduce the reporting

6. Cut your citations

7. Save the smoke screen

8. Stick to schedule

9. Finish fast

on Arbitration Costs

Take it from a man who knows: You can cut your arbitration costs. What's more, you'll get decisions faster. Here are nine easy moves you can make.

MOST MANAGERS—maybe you, too—think they can't cut arbitration costs. Not without damaging union-management relations. But the American Arbitration Association (AAA) says joint cost control by union and management can cut arbitration expenses, speed decisions through the grievance procedure. Joseph Murphy, AAA's vice president for education, suggests that both cooperate in holding costs down. Here are his suggestions:

1. MEASURE YOUR MAN

Find out as much as you can about an arbitrator before you make your choice. Read his opinions and awards, get an idea of his technical qualifications and thinking. Make sure he fully understands the details of your dispute. If your man has never done a job evaluation case, for example, both parties will have to educate him at their expense. Don't hesitate to ask for more information about his record. The AAA will be glad to supply it.

2. ASK FOR AN ANSWER

Do you really need a written opinion? In simple cases that are not likely to recur, you need only an award. If both parties tell the arbitrator not to prepare a long written report, his bill will be less. But if the written opinion is likely to provide a guide for future contract interpretations, it's certainly worth more money. It may serve to avert other arbitrations.

3. AGREE ON THE FEE

Determine the arbitrator's *per-diem* charge in advance. Don't put it off until the hearings are under way. If it's an AAA case, don't discuss fees with the arbitrator—but with the AAA. This way, the arbitrator won't be prejudiced against the complaining party.

4. SETTLE SOME SUBJECTS

Get together with the union and agree on as many facts in the case as you can before the hearing starts. You'll save hearing time—and arbitrator's study time—if you come prepared with names and seniority of grievants, amounts of money involved, and other details of record.

5. REDUCE THE REPORTING

Court reporters and transcripts are expensive. And they delay the award because the arbitrator can't start writing his opinion until he gets the record. Some arbitrators feel obliged to read every word in the transcript. This means more study time at the *per-diem* rate. In rare cases—wage arbitrations, for instance—transcripts are worth what they cost. But they can double the total cost of arbitration.

6. CUT YOUR CITATIONS

Don't use citations unnecessarily. They force the arbitrator to go to the books at study-time rates to find cases that have been decided the other way. What's more, they encourage him to load his written opinion with quotations and citations even if the parties—union and management—don't want him to.

7. SAVE THE SMOKE SCREEN

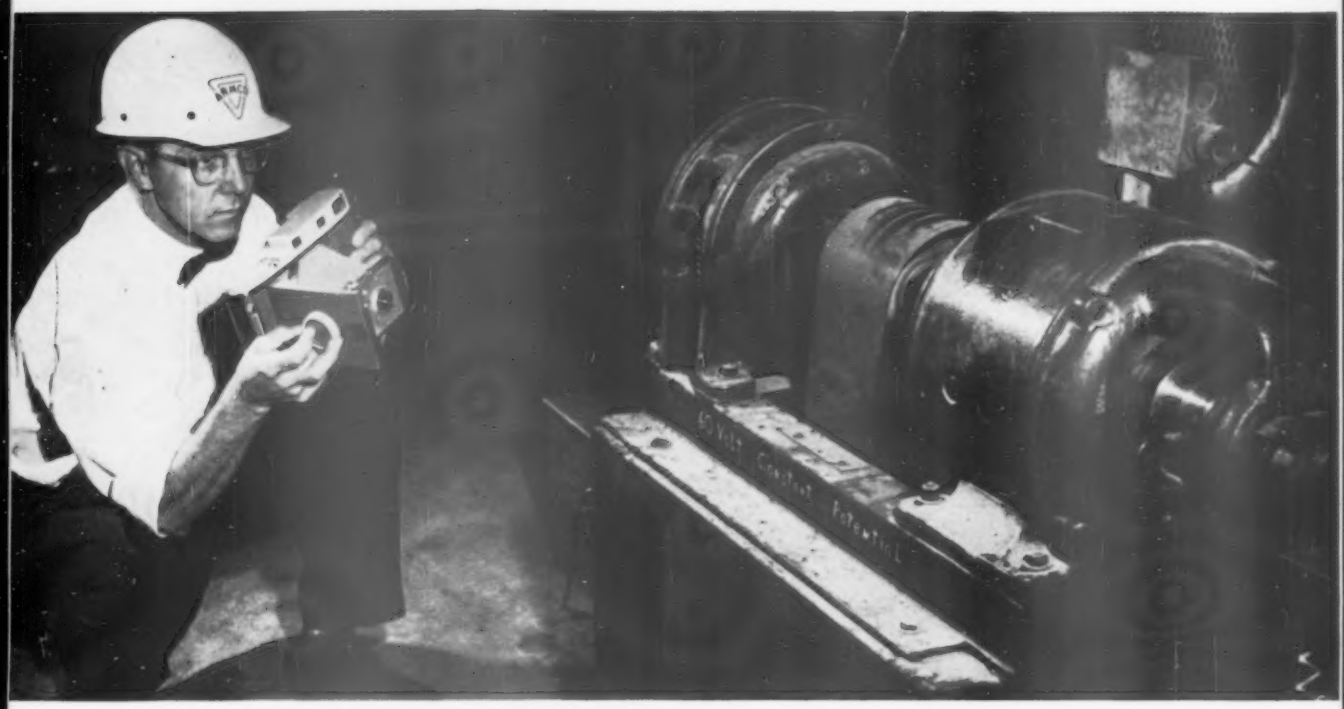
Argue your case on its merits. Forget that old company trick—long a refuge from the facts—of maintaining that the issue isn't subject to arbitration, although you know it really is. Evasion like this causes the hearings to last twice as long, adds to the study-time bill, and irritates some already raw tempers.

8. STICK TO SCHEDULE

Make a hearing date and stick to it. Your arbitrator is a professional man. His services are likely to be in great demand elsewhere. In fact, he may be turning down another case for the day when your hearing is scheduled. So don't ask for unnecessary postponements.

9. FINISH FAST

Watch out for hidden costs. The "back pay meter" may be running while you delay the meeting. The liability for retroactive pay to a discharged worker, or to employees who should have been recalled from lay-off, may be far greater than the arbitrator's fee. But even when there are no financial risks, a quick decision is advisable. Keeping grievances on the hook too long seldom helps employee relations.



CAMERA STUDIES ARE JUST ONE WAY OF GETTING METHODS IMPROVEMENT IDEAS THAT HIT COSTS.

MANAGED MODERNIZATION At Work

Focusing on Costs . . .

. . . with cameras, campaigns, and coordinated efforts. That's how Armco bags big dividends on costs—cuts time, improves quality, boosts output.

SAVING TIME with a camera. That's what the photographer in the picture above is doing. And he's only one example of many cost-saving methods at Armco Steel Corporation, Middletown, Ohio.

How does a picture help Armco keep costs down? It helps by saving costly engineering time when equipment needs repair or re-design.

Before the photograph system was thought up, the engineer on a job had to make several trips to the plant to look the equipment over and check his recollections as he made headway in his design work. Then he'd make up detailed drawings to back up his verbal explanation of the repair or re-design. Armed with drawings and plans, he would explain changes to the maintenance mechanic assigned to the job.

The photos reduce the number of plant trips needed. They help the engineer visualize the equipment. And they make many detailed drawings unnecessary, because workmen can more easily understand instructions given with photos for reference.

Cost of the photos is low. A Polaroid Land camera (the kind that gives finished pictures in one minute) is used whenever possible. Picture cost is only 30¢ each. The camera costs about $125.

CAMPAIGNING FOR IDEAS

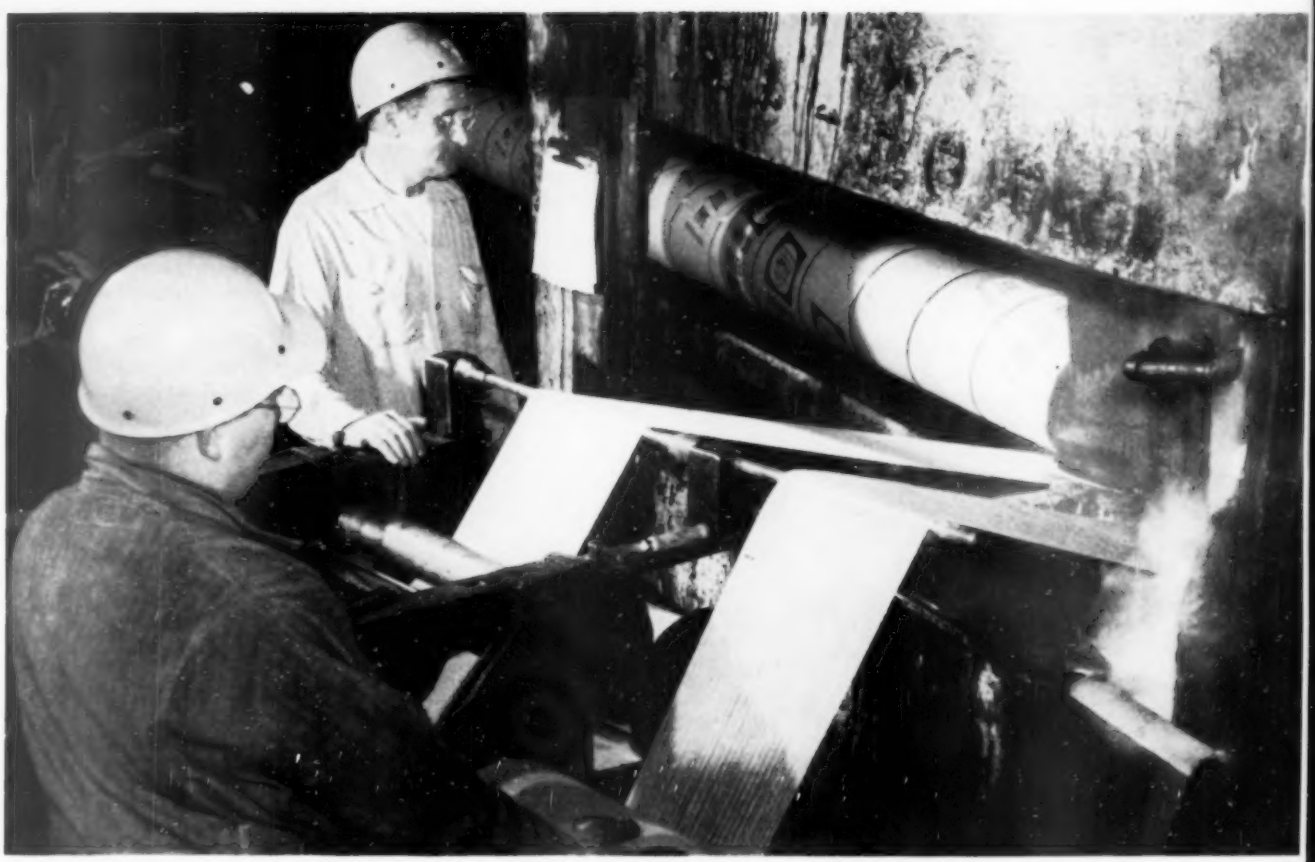
Early last year small signs with the letters K.C.D. mysteriously appeared in hallways, eating areas, locker rooms, and other plant and office areas. No explanation of the letters was given for several weeks. Then the plant newspaper, *The Arm-co-operator,* revealed that K.C.D. means Keep Costs Down. Thereafter, for six months, every issue of the paper carried a full two-page spread of ideas that had been generated in response to K.C.D.

The cost-control theme was bannered in other ways, too. Editorials pumped the idea. Weekly newsletters to supervisors and employees repeated the theme. Armco's suggestion program and methods improvement program were brought into the campaign. (The methods improvement program is a plan for supervisors, who try to produce at least one improvement each month.)

Now, for seven smart methods ideas that were developed during the company's K.C.D. campaign, look at the next three pages.

No More Collapsed Coils

Customers are happier because of this method improvement. They can get even their lightest-gage coils of steel on their mandrels. Before the corrugated steel inserts were suggested by an Armco supervisor, light-gage coils collapsed out-of-round under their own weight. In addition to improved customer satisfaction, the inexpensive corrugated inserts (cost: $1.25 each) pay their way in reduced storage space requirements. With the inserts in place, coils can be stacked higher. And quality is better. Collapsed, out-of-shape coils suffered edge damages easily.



Two Coatings (Not One) Save $5000 a Year

The job you see being done above used to be a two-operation sequence. The men are wrapping pipe with bitumastic enamel and paper.

Old way was to add enamel and paper once as the pipe rotated past the wrapper. Then the pipe would retract and rotate past again for a second coat of each. New way calls for extension of the paper carriage to accommodate two rolls of paper and the addition of a second coating nozzle. Cost of changeover: only $300.

Turn the page

Begins on page 80

Double Dispenser Saves $1338 Yearly

Banding steel coil takes two men. But most banding dispensers give only one strip at a time, so workers pre-cut extra lengths for the second man—cut them long to make sure there's enough. This way, Armco used to waste about 18 inches of banding per coil. The double dispenser (above) serves two men. It was built for $85.

Little Rollers Cut Downtime

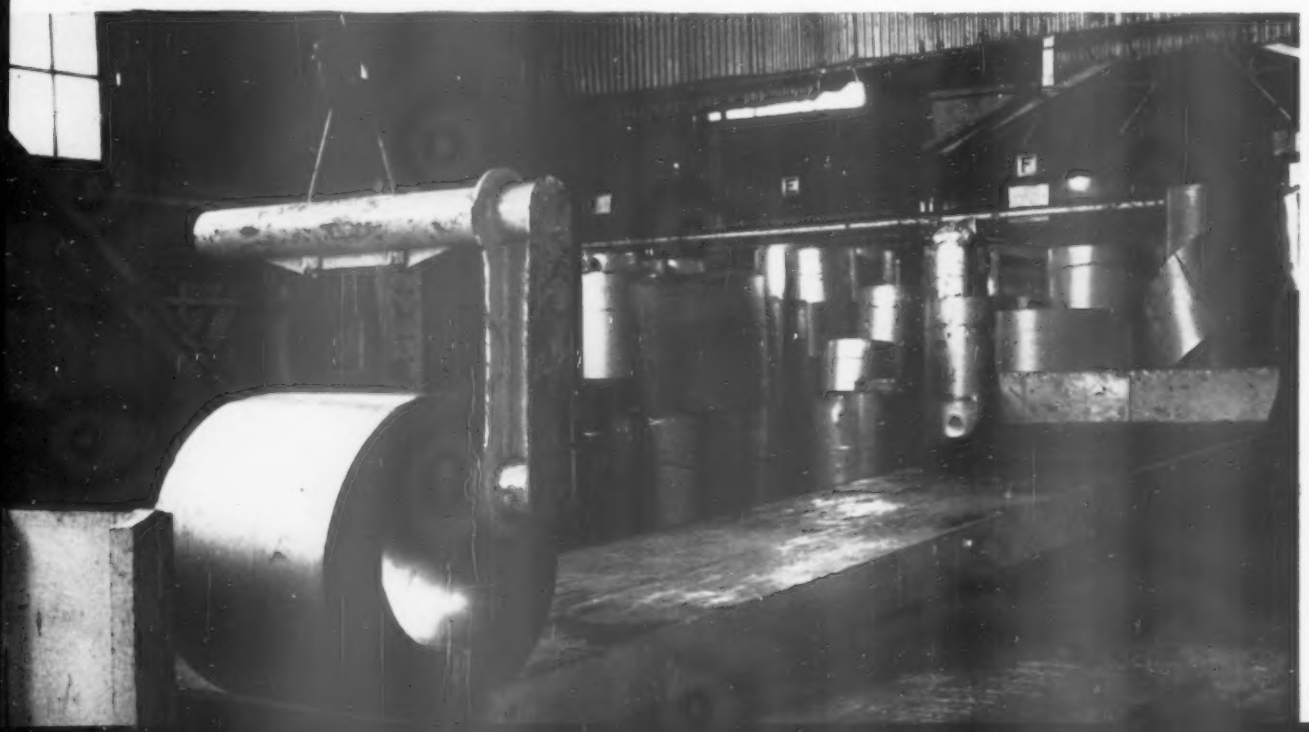
When steel plate is sheared, operators pile it neatly against a guide at the side of the piler. If the pile of plate isn't just right, the shear must be stopped and the plates re-piled. Shear used to be down about 12% of the time. The three small rollers (above) reduce the effort involved in piling. Neater piles, and much less downtime are the result. The rollers are adjustable for height and angle. They cost about $40.

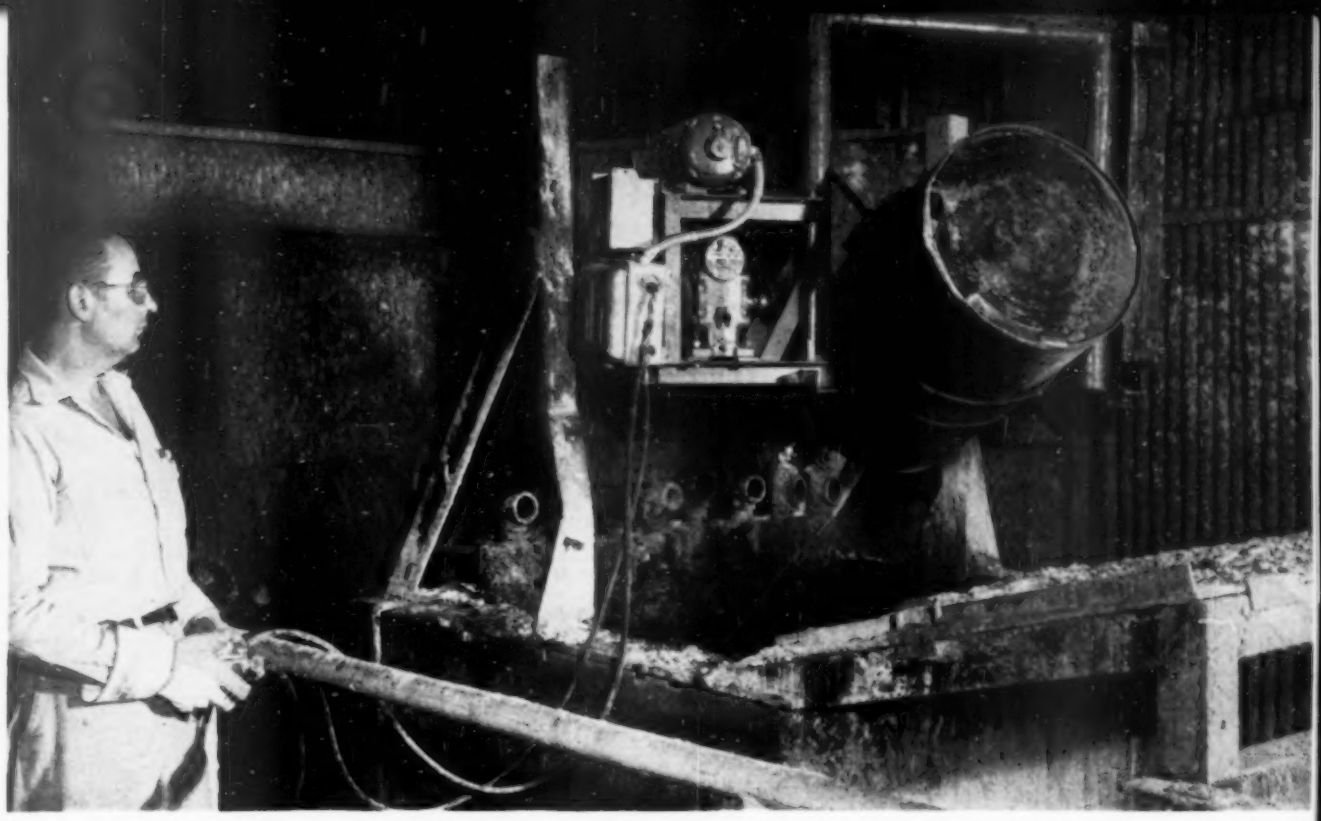
Gravity Conveyor Takes the Place of a Larry Car

Steel coil stock is stored in one building, used in another. Slow handling and high costs led to idea.

Old way involved a crane to lift coils and place them on a down-ender. Then the crane lifted the coils again, placed them on a larry car for transfer.

New way makes use of a gravity conveyor with a down-ender at the storage (high) end. Crane lifts stored coils only once, to place them on the down-ender. Transfer from that point is automatic. Cost: $17,396. Savings: many times the cost.

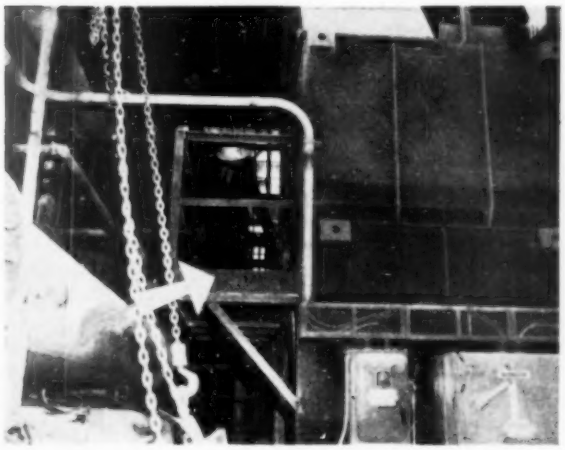




Barrel Dumper Saves Time, Cuts Hazard

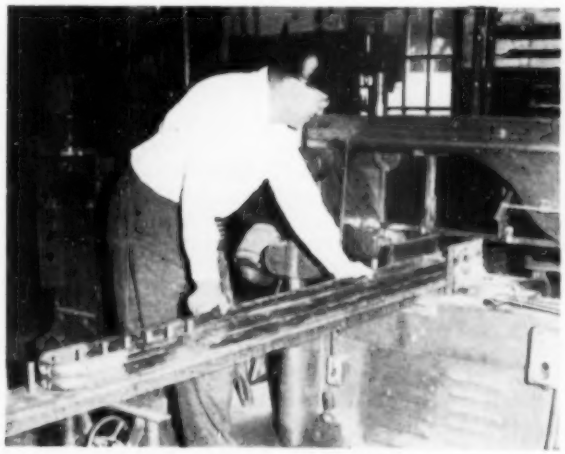
When it's time to dump a barrel of caustic into the wire-cleaning tubs, the operator clamps a steel belt around the barrel, raises it above the tub with an overhead crane. Then he picks up the controls for his motorized barrel dumper, does the job from a safe distance. He saves enough time to pay for the device (cost, $775) in one year.

Old way of dumping drums was with a rope sling. It created an accident hazard and posed a housekeeping problem when caustic spilled on the floor.



Platform Speeds Cleanout

Twice the cost of this platform (arrow, above) was recovered the first year it was installed. It's to speed cleanout of dust collectors, a once-per-week job. And the operator is a good deal safer with the new platforms. Job used to be done from a stepladder. Cost of the platform: $350.



Simple Jig Saves $500

Open-hearth superheaters are cut to length in a jiffy with this simple jig ($25 total cost). Old way: Each U-bent pipe was laid out on the floor on a wooden template, marked for length, then cut in the power saw. New way—with jig—eliminates need for layout, permits cutting two pipes at once.

My candidate for

FACTORY's "Top Plants of 1960" Awards:

Plant name .....

Plant address .....

(Street) (City) (Zone) (State)

Company name .....

Plant or company executive who can give FACTORY additional information:

Name .....

Title .....

Address .....

(Street) (City) (Zone) (State)

My own name .....

My company name .....

My company address .....

(Street) (City) (Zone) (State)

I have other plants to nominate. Please send me _____ additional nomination blanks.

This coupon, filled out and mailed in, could be . . .

Your Winning Ticket in 1960

TICKET to what? Three things, really. Here they are:

• **An exciting race.** The coupon above, filled out, will enter your new plant (or the new plant of your neighbor, your friend, or your client) in FACTORY's 26th annual competition to pick the ten top manufacturing plants built across the nation in 1959.

• **A Hall of Fame.** Winners in this annual contest earn nationwide recognition and prestige. The entire issue of FACTORY in May 1960 will be given over to a full account of the winning plants, complete with dramatic photos, watercolor paintings, and descriptive text. This May issue will carry the word about your winning plant to FACTORY's 70,000 subscribers in the manufacturing industries. What's more, there'll be opportunities for exciting publicity in your local and state newspapers.

• **An Awards Dinner.** If your plant emerges as one of the Ten Top Plants of 1960, the coupon above can be your ticket to the Annual Awards Dinner in New York City this next May. You'll sit down with the top executives of other winning plants—and with the architects, engineers, and constructors who designed and built them. FACTORY editors will present you with your own individual award. It should be a wonderful opportunity to swap experiences, pick up new ideas, and make brand-new friends.

How the race starts—How does FACTORY learn about new plants to be considered in this annual contest? Mostly from readers like you, who are proud of a new plant and are willing to take a minute to fill out the coupon above and mail it in. Other sources: architects, engineers, builders, state and local chambers of commerce, industrial development commissions and executives, personal and business friends of new-plant owners.

What happens next? FACTORY will send you—or the person you designate on the coupon above—a questionnaire about the new plant. This questionnaire will guide company executives in gathering the facts and the photos that the editors need for making a preliminary evaluation of your nominee.

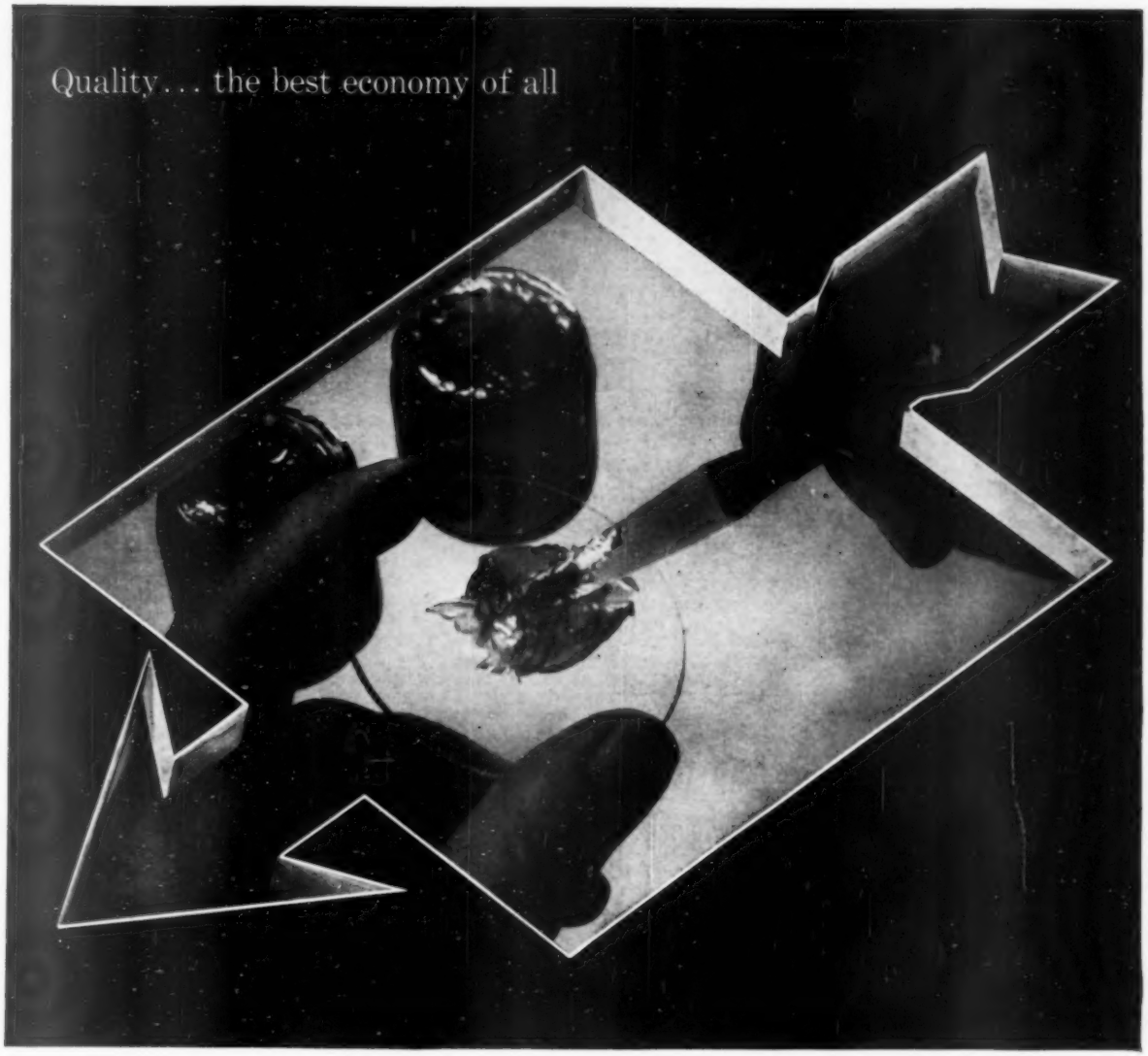
Winners emerge — FACTORY editors will study the returned questionnaires, together with data and photos submitted. Often they'll ask for still more information. They'll screen—again and again, write hundreds of letters, travel thousands of miles. (For the whole story of evaluation, see FACTORY for May 1959, pages 61-62.) At last, in debates that often go on into the night, they'll settle on the Top Ten. Your plant could be one of them.

Speed needed—There's work for lots of plant executives in this competition. (The questionnaire is exhaustive.) Work for editors, too. That's why it's important for you to fill in the coupon and send it in—right now. It's FACTORY's best way of learning about the hundreds of new plants being completed across the nation this year.

So take the first step today. You may be writing your own ticket to New York next May. Fill out the coupon and mail it to:

Oswald Stewart
Buildings and Facilities Editor
FACTORY
330 West 42nd St., New York 36

Act fast. Completed questionnaires must be in FACTORY's hands by Oct. 1. That means you must send in the coupon in time for FACTORY to mail out the blank questionnaire to your nominee—and in time for him to mail the completed questionnaire by Oct. 1.



It's a multipurpose grease . . . but *how* multipurpose?

You can't "feel" the answer. Any "multipurpose" grease you buy is a compromise. Lubrication engineers say it *can't possibly be* the best lubricant both for high speeds and low loads . . . and for low speeds and heavy loads. It's *got to be* somewhere in between, so that it can do both jobs fairly well.

What you should do is decide on *which* multipurpose grease is best for you. This is a decision for an expert team—you and your Sun representative—because you have to consider many variables.

We feel, justifiably, that one of Sun's Prestige Multipurpose Greases is designed with that wide range of applications you're looking for. They last longer under pressure, water, heat, and other abuses. They bear investigation. To start enjoying the real economy of quality, call that Sun man today—or write direct to SUN OIL COMPANY, *Philadelphia 3, Pa. Dept. F-8. In Canada: Sun Oil Company Limited, Toronto and Montreal.*

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

FACTORY EQUIPMENT NEWS

For more about these items, circle numbers on Reader Service Card next to back cover.

SWIVELING FORK LIFT ON 4-WHEEL POWER TRUCK . . .

Stacks Both Sides of 6-Ft. Aisle

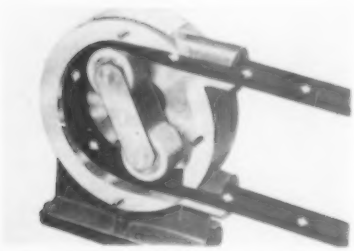
"Naro-Aisle-Stacker" needs only a 6-ft. aisle to stack a 4000-lb. load up to 144 in. Result: valuable space saved for storage. That's because of unique swivel fork lift. Truck doesn't have to turn to get into stack, only the lift pivots. Manually operated outriggers project from sides of truck, steadying lift as it turns and rises. Safety interlocks prevent truck from moving when load is raised or forks pivot. Truck retains maneuverability, speed, and comfort of sitdown types. Gas or LPG models; weighs 6900 lb. *Towmotor Corp.* (Circle 101).

102—Liquid Filter cleans out dirt down to ½ microns in cutting, drawing, and similar oils, also washing solutions and solvents, for as little as 0.00015¢ per gal. Cycle is controlled by pre-set timers. In 8 models, 10- to 600-gpm. capacity. *American Laundry Machinery Co.*

103—"Quartzline" Lamp is pencil-thin, does not blacken during lifetime. Maintains 99% original light output compared with 90% for average incandescent. Two sizes: 500-watt tube is over 4½ in., produces 10,500 lumens; 1500-watt is 10 in., 33,000 lumens. *General Electric Co.*

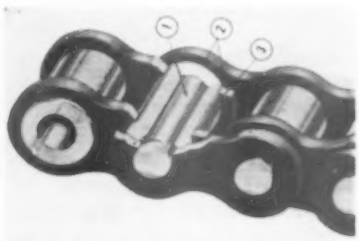
104—Air Filter, for small instruments, checking gages, and miniature valves, removes sludge, rust, and dust particles as fine as 5 microns. This small 4-oz. unit can be attached directly to inlet or air device. Has ¼-in. male and female connections. *Wilkerson Corp.*

105—Automatic Battery Charger saves ⅔ floor space of conventional chargers by using vertical m-g unit. Can also be mounted off floor. For truck batteries, it comes in four sizes and 25 ratings up to 800 amp.-hr. Shuts off at full charge. *Electric Storage Battery Co.*



106—Fluid Pump solves problem of handling corrosives, sterile solutions, abrasive slurries, and gases without blockage. Flexible tube passes through pump body, and squeegee action of double rotor pushes liquids or gases through. In 54- and 185-gph. models. *Randolph Co.*

107—"Tapeswitch," waterproof, for use where moisture and liquids make conventional switching difficult. Normally open circuit closes when finger pressure is applied anywhere along its length. Lengths: 6-in. to 10-ft.; 28 v. a-c at 1 amp. *Tapeswitch Corp. of America.*



108—Drive Chain, with oil-impregnated bushings, assures low maintenance, long life. Pressure and heat cause built-in lubrication to expand and flow from bushings to every part of chain. When drive stops, bushings re-absorb oil for continuous re-use. *Whitney Chain Co.*

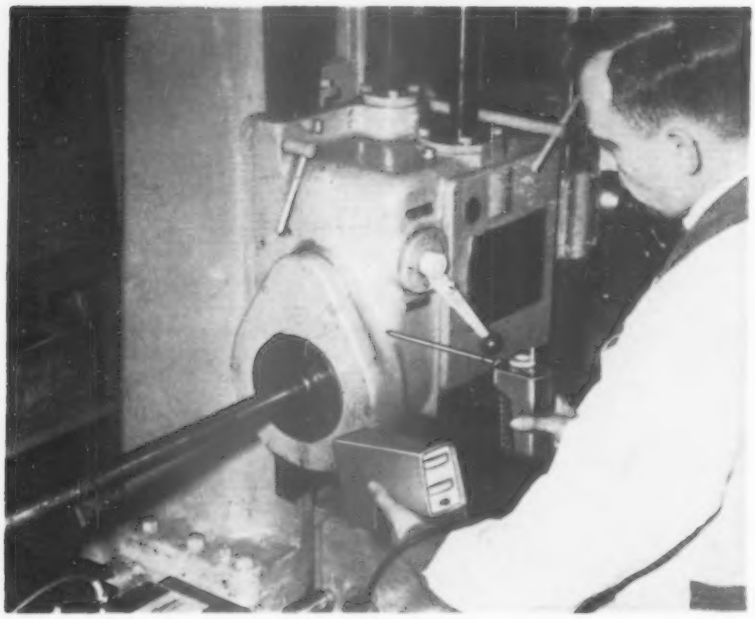
Turn the page

A Pepsi break for efficiency's sake...

Modern plant management recognizes the importance of a refreshment break, knows it boosts morale, efficiency and productivity. Especially true when today's lighter Pepsi-Cola is the refreshment, because it's preferred by up-to-date people everywhere.

There's another profit motive, too. A machine vending Pepsi—in disposable cups or in single-drink bottles—pays substantial profit with no investment . . . no service problems . . . no maintenance. Look into this modern personnel refreshment program. *Call your local Pepsi-Cola Bottler today, or write: National Accounts Dept., Pepsi-Cola Company, 3 West 57th Street, New York 19, New York.*

For more about these items, circle numbers on Reader Service Card next to back cover.



Easy-to-Read Vibration Analyzer

Shakes, rattles, and rolls in all types of machinery are detected and pinpointed by this portable vibration analyzer. It's accurate, but rugged. Analyzes while machine operates. Sensitive, it adjusts to amplitudes from 10-millionths to ⅛ in. Good for eliminating vibration in grinding wheels and cutter heads to get finer finishes and closer tolerance work; for worn bearings, belts, and misalignments.

The device consists of strobe and meter head, electronic analyzer, vibration pick-up and pick-up extension cable. Strobe light locates the exact spot of imbalance; electronic analyzer tells how much imbalance. Easy-to-read meter records amount of vibration. Unit comes with another outlet for connecting second pick-up should an extra long piece of machinery need balancing.

Other advantages: Cuts maintenance, improves product quality by detecting imbalances in fans, couplings, shafts, rolls, motors, etc. *Stewart-Warner Corp.* (Circle 109).

Free Pistons Pump Anything That Flows

Pump of unique 3-cyl. design uses compressed air to pump anything from molten metal to ice cream. Only three moving parts in each cylinder—free piston, inlet and outlet ball valves. Cylinders fill by gravity feed and empty in sequence as air pushes pistons. Two cylinders can function while third is cleaned or repaired—an operation taking only 15 minutes. Pump comes in models from 5 to 1000 gpm., and 10- to 2000-psi. capacities. Remote control box guides operation. *Crossley Machine Co.* (Circle 110).

111—Stop Clock times and controls operations in lab or production. Front panel outlet permits remote manual or automatic running. Other outlet for automatic timing of 115-v., 60-cps. load up to 3 amp. Legible dial; color-coded run-reset buttons. *A. H. Haydon Co.*

112—Power Sweeper, rider-type, covers up to 100,000 sq. ft. per hr. Sweeps a 36-in. swath. With one optional side broom, swath is 47 in.; with two brooms, 58 in. Turns in 66-in. radius. Hopper holds 750-lb. debris; dumps when operator pushes lever. *Clarke Floor Machine Co.*

113—Input Controller regulates the ratio of "on" to "off" time of electric heating load. Turns circuit on from 1 to 100% of 30-sec. cycle. Rated 15 amp. at 115 or 230 volts. Comes with indicating lights for line and load, built-in terminal block. *Edwin L. Wiegand Co.*

114—Portable Straightener-Bender saves time and drudgery of forming pipe, channel iron, tubing and bar stock to flat or curved shape. Eliminates sledge hammer, hydraulic jacks and blocks. Operator can exert 5-ton pressure with little effort. *Architectural Iron, Inc.*

115—Gas Cleaner removes 80% of sub-micron dust and oil particles, and almost all those greater than 2 to 3 microns. Ten-step "Multi-Phase" unit handles volumes up to 18,000,000 cu. ft. per hr. at 1000 psig. In 18- to 72-in.-diameter sizes. Low oil loss. *Blaw-Knox Co.*

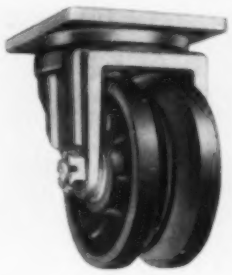
Turn the page

MATERIALS-HANDLING NEWS

NEW AND UNUSUAL APPLICATIONS OF BASSICK CASTERS THAT MIGHT BE ADAPTED TO YOUR HANDLING PROBLEMS

Missile on casters. Nike-Hercules near end of final assembly line, as specialists install cable for guidance system at plant.

CASTERS AID AUTOMATION OF MATERIALS-HANDLING



For inverted angle iron tracks: Bassick grooved wheel casters effect amazing reductions in handling costs. Light, medium, heavy and super-heavy duty models.

For heavy duty dragline truck systems: Bassick Series "S99" casters combine the advantages of strength (heavy gauge steel) with light weight and economy. Sealed bearings optional.

On display at the Materials-Handling Industry's Triennial Convention in Cleveland, this year, will be in-floor dragline systems, overhead chain belt pulleys, tractor pulled truck trains, monorail and dual track set-ups.

These and other advances toward the automation of materials-handling are increasing throughout heavy industry. Here labor traditionally accounts for the bulk of operating costs and labor-saving devices are constantly being sought.

Casters that can take relatively high speeds and abuse of such power-pulled applications have also been developed over the years. Shown here are some of the specially designed Bassick casters with features that suit them for automatic and semi-automatic handling systems. Because of their widespread acceptance, these are now standard casters in Bassick's line and are available through local industrial distributors who handle Bassick casters.

For power-drawn truck trains: Bassick Trailer Duty casters with heavy duty semi-steel or Bassick "On-core" wheels (shown) will take the abuse of rough floors, high speeds. Milspec and "Floating Hub" models also available.

Casters give important savings in all industry and business

Following the lead of heavy industry, many light industrial firms, warehouses, and even retailers are finding reduced operating costs via streamlined materials-handling.

Casters have kept pace. Recent Bassick developments in addition to the H68 casters shown below include:

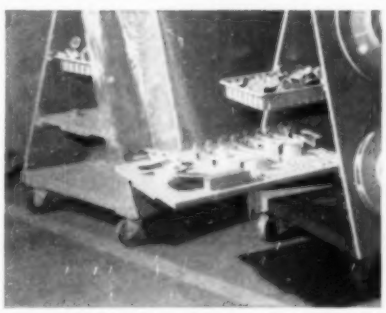
A light duty Floating Hub caster with a shock-absorbing, spring-controlled wheel designed to accommodate loads from 50 to 150 pounds. The "B-Line" of 4", 5" and 6" sanitary casters designed for easy cleaning. These are ideal for use in food processing, bottling plants, restaurants, bakeries . . . anywhere cleanliness is important.

Medium light duty Series H68 casters with two level ball bearing swivels, are ideal for industrial, warehouse and store applications. All exposed metal surfaces are zinc plated. Long service life.

Distributors Stock Casters

Local industrial distributors who handle Bassick casters carry most popular models in stock, can deliver promptly. They can recommend the most efficient casters for your specific job. And where necessary, they may call in a factory representative for engineering recommendations or special caster designs. All of which makes your local Bassick distributor a handy man to know. 9.37

Rocket parts on castered carts save handling time, money



At this California aircraft plant, "A" frame carts, riding on Bassick casters, bring rocket turbo pump parts to the job. Top plastic shelf alone holds 100 small parts, larger components hang from sides of the cart on metal pegs.

Time saving here over separate handling of 150 components is tremendous. Parts carts on casters might cut costs for your plant, too.

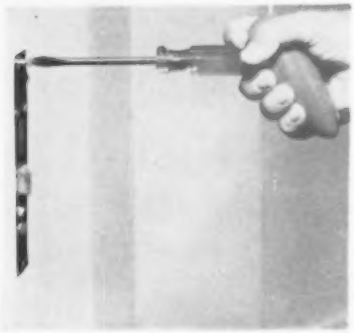
THE BASSICK COMPANY
BRIDGEPORT 3, CONN.
IN CANADA:
BELLEVILLE, ONT.

Sweet's

Symbol of SW Excellence
Bassick
A DIVISION OF
STEWART-WARNER CORPORATION

For more facts Circle 491 on Reader Service Card

For more about these items, circle numbers on Reader Service Card next to back cover.



116—Screwdriver fits into egg-shaped plastic handle that contains ratchet mechanism. Can set for clockwise or reverse strokes. Drives stubborn screws with no painful hand abrasions to operator. "Power-Egg" comes in ¼-, 3/16- and 5/16-in. sizes. *Cuyahoga Products Corp.*

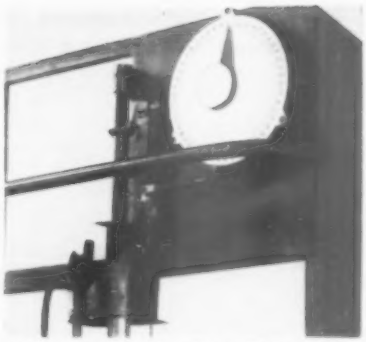
117—Vacuum Conveyor System, specially designed for small parts conveying, picks up and transfers wet or dry fluids to processing equipment. Low cost, little maintenance; non-electric (good for hazardous locations). Can use as auxiliary or main system. *Vac-U-Max.*

118—Elapsed Time Meter records in hours, tenths of hours, or minutes, total operating life of machine. Motor drives 5-digit register through gear train to assure accuracy. Hermetically sealed; self-starting; 2½- and 3½-in. flush panel mounting. *Herman H. Sticht Co.*

119—Plastic Drum holds 55 gal., weighs only 10¼ lb., and costs 75% less than stainless steel one; 2-ft. diameter, 31-in. tall. Tight-fitting, splashproof lid fastens securely with steel closure ring. Nests for storage, is acid-resistant, dentproof. *Redmanson Corp.*

120—Swivel Joint Connector absorbs flexing strain on hydraulic hose, thus eliminating hose failure. Adjusts to hose angle under pressures up to 5000 psi. Permits use of stiffer, longer-lasting multiple-spiral wire hose. Sizes from ½ to 1½ in. *Eastman Mfg. Co.*

121—Electronic Computer adapts to all types of punched-card installations. Requires no conversion equipment. Photo shows 80-column card reader, 1 of 4 units comprising "solid state" system. Reads 58,800 words per sec., adds 11,760 numbers per sec. *Sperry Rand Corp.*



122—Automatic Cart Dispatching and switching is effected by setting above dial to pre-selected station. Cart moves along in-floor or overhead towline and is diverted at station. Low-cost, tailor-made system is fast, accurate; little maintenance. *SI Handling Systems, Inc.*

123—Nozzle Liner, for process equipment, minimizes corrosion, reduces build-up of solids at tube openings. Made of Teflon, it resists acids and chemicals at temperatures to 500 deg. Fits pipes from 1 to 6 in. Shock-resistant for lining glass, etc. *Resistoflex Corp.*

124—"Pilot-Arc" makes it possible to get positive arc starting for tungsten-inert-gas spot welding or cutting in a split second. It keeps ball of incandescent gas within cup so that arc is always ready to fire. Current is adjusted to about 5 amp. *Union Carbide Corp.*

Miniature Railroad

No "Tootsie Toy" is this miniature railroad. It transports heavy materials on 24-in.-gage track, and hauls up to 8 tons on two baby trail cars. Half-pint rail tractor is driven by storage battery. Tractor can start fully loaded train from a standstill on an 8-ft. curve, and attain speeds of as high as 300 fpm.—a good walking pace—on the straightaway. Each car has a 4-ton capacity. Train can haul any load on flat cars. Good for long hauls in large plant areas. *Easton Car & Construction Co.* (Circle 125).

Turn the page

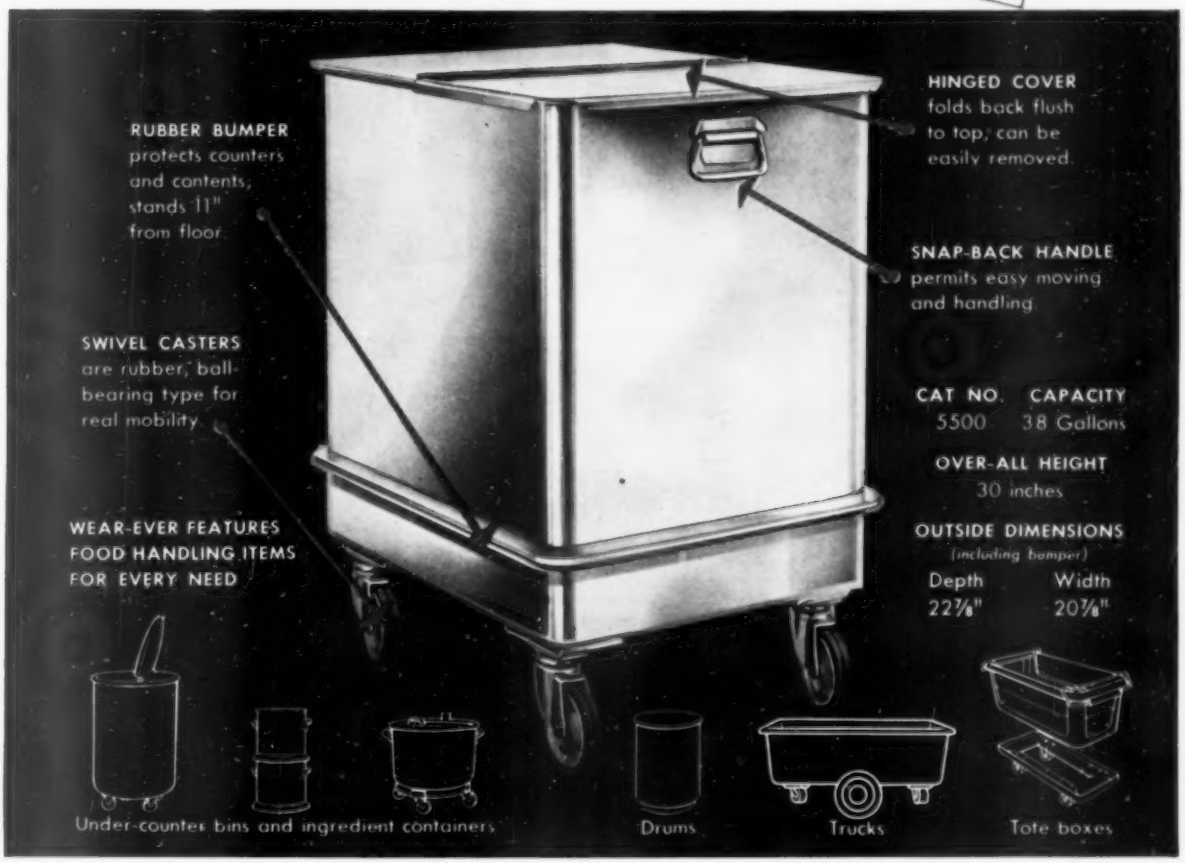
33-1/3% more capacity . . . 24" and 30" heights

in this new rectangular, mobile under-counter type

BIN

by WEAR·EVER

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.



We've "squared away" the conventional round container, to give you ⅓ *more* carrying and storing capacity, *in comparable over-all size.* Think what this can mean to you in faster handling, fewer refills, greater utility.

Quality's the same, of course, as in all Wear-Ever Aluminum food handling items. Extra hard-wrought dent and scratch resistant alloy. Seamless construction. Smooth, rounded, easy-to-clean inside corners. Sanitary flared rim.

Naturally, we've designed this new container for a perfect fit under your standard cook's and baker's work tables —same as the round type.

Like to see a sample? Pick up the phone and ask your Wear-Ever man to wheel one over. Or send coupon for full details on our complete food handling line.

Ask us about our special equipment to your specifications.

WEAR·EVER ALUMINUM UTENSILS

WEAR-EVER ALUMINUM, INC.
WEAR-EVER BLDG., NEW KENSINGTON, PENNSYLVANIA

Wear-Ever Aluminum, Inc.
305 Wear-Ever Bldg., New Kensington, Pa.

GENTLEMEN: *I'd like to know more about your new rectangular under-counter bin.*

☐ Send me your catalog. ☐ Have your representative see me.

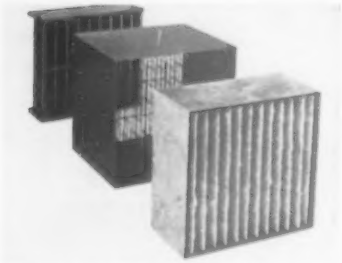
NAME .....

TITLE .....

Fill in, clip to your letterhead and mail today.

NEW ITEM! *Wear-Ever's new Metal Scouring Cloth. Won't scratch, won't mar, far outlasts ordinary scouring cloths. At your dealer's.*

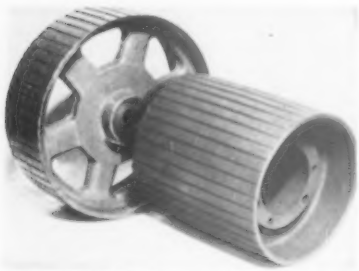
For more about these items, circle numbers on Reader Service Card next to back cover.



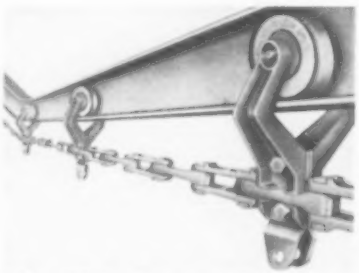
126—Dust-Odor Filter, in compact frame, has 1000-cfm. capacity. Comes alone or as package with two sections: a 12-in.-deep "Aerosolve" filter cartridge of 95%, 85%, or 35% discoloration efficiency on atmospheric dust; and a charcoal odor filter. *Cambridge Filter Corp.*

127—Belt Conveyor, with oversized shafts, crown-face pulleys, self-lubricating bearings, is built for low maintenance. By adding or removing standard parts, each of 5 styles converts to any other. Belt sizes: 14 to 24 in.; speeds: 34 to 77 fpm. *Samuel Olson Mfg. Co.*

128—Portable "Snooperscope" permits surveillance in dark where you want to view without being seen. Infra-red unit locates burning objects in smoke-filled areas. Useful in research such as chromotography to observe luminescence of minerals. *Edmund Scientific Co.*

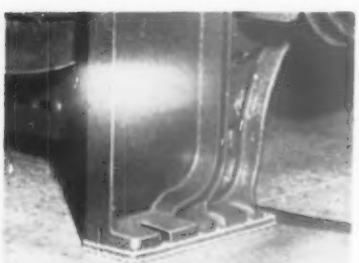


129—Belt Pulley, with corrugated cross-grooved surface, operates quietly and with less slippage for longer belt life. May be used to replace original equipment in any flat-belt power transmission. In 3½- to 16-in. dia., widths to 12 in. *Republic Engineering & Mfg. Co.*



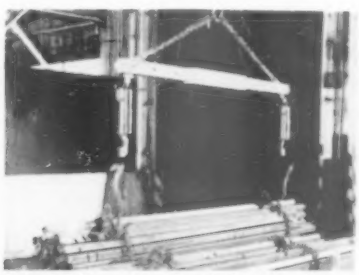
130—Chain Conveyor System uses free overhead area to carry products of all types and sizes. Flexible, it goes up, down, in, out, or around. May be added to present systems of similar design. Adapts to expansion or relocation. Mechanically propelled. *Richards-Wilcox Mfg. Co.*

131—Fork Truck can stack 48-in.-long loads at right angles in 7-ft. aisles. Hand-operated power brakes, power steering, dual operating controls, 2-wheel drive, automatic fork tilt. Top speed, 6 mph.; capacity, 4000 lb.; lifting speeds, 33 to 70 fpm. *Clark Equipment Co.*



132—"Vibra-Check," a synthetic chemical-resistant padding, eliminates 90% of destructive vibrational tremors and noise caused by machines. Needs no bolts or adhesives to install on 100-lb. to 100-ton units. Under $10 to equip average machine. *Lowell Industries, Inc.*

133—Air Hammer cuts hand-calking time up to 75%. Single finger controls trigger to permit up to 13,000 blows per min. Kit accessories adapt hammer to star drill, to cut sheet and galvanized metal, and to test gas and water lines. *Superior Pneumatic & Mfg., Inc.*

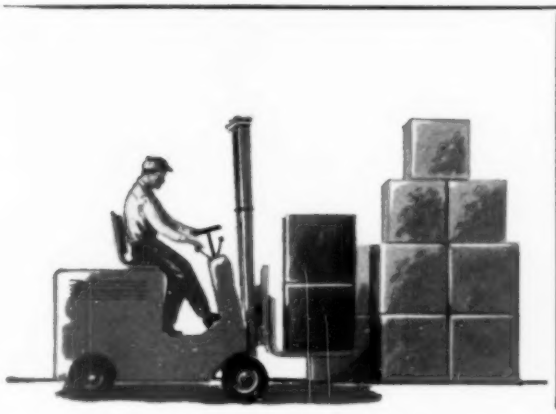


134—Sling Load Release, 5-ton capacity, expels chain or cable from hooks to release load safely. Solenoid-operated, works from remote control pushbutton in cab. If power fails or button is pushed accidentally, load isn't released. Single units. *American Chain & Cable Co.*

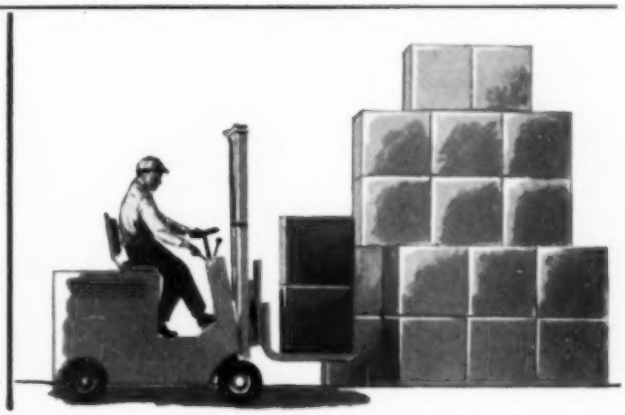
Turn the page

YOUR Electric Truck BATTERY

Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 20, Pa.



Equip any electric industrial truck with an Exide-Ironclad Battery . . .



. . . and you boost its work capacity . . . earn a bigger investment return.

EXTRA POWER IN EXIDE-IRONCLAD GETS YOU MORE WORK FROM YOUR PRESENT SIZE FLEET

Put a more powerful battery in any electric industrial truck and you boost its work capacity. Multiply the boost by the size of your fleet and you get an idea of just how much more valuable Exide-Ironclad Batteries can make your trucks.

Each Exide-Ironclad Battery now packs at least 25%, up to 44%, more power than the most powerful truck batteries previously sold. So if you want more truck work capacity, you can get it from your present size fleet. Equipped with new Exide-Ironclad Batteries, each of your present trucks can handle more per shift, move it farther, work longer hours . . . in other words, they can do more, much more, than they ever did before.

Improved battery construction

Exide-Ironclad tubular plate batteries have proved their superiority in thousands of applications. Today they feature new, more advanced tubular construction that dramatically improves performance and extends life potential. This is the latest step forward in the 50-year progress of Exide-Ironclad Batteries. The new armored porous tubing holds the active material even more firmly captive against loss. Greater porosity improves access of electrolyte for sustained high-load capacity. And inside, where vital current flows from the positive plates, Exide's patented Silvium alloy resists corrosion as much as 100% longer than other commonly used alloys.

Now each positive plate in Exide-Ironclad Batteries packs more power into the same battery space. Battery materials are used more efficiently for greater power per dollar. Here, truly, is today's outstanding battery value for electric industrial trucks.

For more details on the new Exide-Ironclad Batteries, write for a copy of our 8-page, illustrated brochure #6230

50 years of constant improvement have gone into today's Exide-Ironclad Battery. Latest advance is the improved tubular construction of the positive plate. Skillful application of the most modern, virtually ageless, materials means longer lasting battery power in industrial truck service than has ever before been possible.

Exide Complete Power Package . . . includes chargers too

For all the value and economy Exide can offer you, make sure you get chargers from Exide too. That way, you get the complete Exide power package. New Exide vertical-design chargers are specifically designed for industrial truck use. Available in a full range of ratings for all trucks, and with operating features unmatched in the field. They save two-thirds in floor space required. Can be wall mounted. Operate cleaner, so they need less upkeep. In addition, you get the advantage of reliable, thorough and regular Exide service for both batteries and chargers. Write for new brochure giving complete information.

Exide®

For more facts Circle 493 on Reader Service Card

TRADE ARRO MARK

MACHINE SCREW ANCHORS

Easy to install . . . requires shallow hole . . . fixture can be removed and replaced without loosening anchor . . . a few hammer blows set anchor firmly . . . conical-shape nut expands lead sleeve to provide strong holding power . . . widely used by electricians, plumbers, carpenters, ornamental iron workers, maintenance men, awning and sign

Cutaway drawings show how setting tool expands lead sleeve around conical nut.

HAMMERLESS SETTING TOOL

Expander hammerless setting tool for easy installation of Arro Machine Screw Anchors in hollow tile, bottomless or weak-bottom holes.

THE TRADE ARRO MARK LINE OF MASONRY ANCHORING AND DRILLING DEVICES

See your industrial, hardware or electrical supplier

ARRO EXPANSION BOLT COMPANY

DEPARTMENT E, P.O. BOX 388, MARION, OHIO.

For more facts Circle 494 on Reader Service Card

For more about these items, circle item numbers on Reader Service Card next to back cover.

135—Intercom System is specially designed for communicating in presence of extremely loud operating noises. Padded earphones cut extra 10 decibels of sound for better reception, protection against injury. Talk by pushbutton on mike shield. No feedback. *David Clark Co.*

136—Corrosion Tester spots as little as one-millionth of an inch corrosion, and one-billionth in special applications. "Corrosometer" tracks corrosion as it occurs; eliminates tedious plotting when timing and extent of initial attack is unknown. *Crest Instrument Co.*

137—Portable Current Transformer hooks on to permit accurate load surveys on insulated or uninsulated conductors carrying up to 13.2 kv. No need to open conductors or interrupt service. Comes with two models of strip-chart recorders. *General Electric Co.*

Turn the page

Sure-There Are Several Good Brands of Trichlorethylene

But Only DETREX Can Supply You With the Best of All Three: Solvent – Equipment – Engineering

Depend on DETREX for Every Metal Cleaning and Processing Need

- PERM-A-CLOR NA (Trichlorethylene)
- Solvent Degreasers
- Ultrasonic Equipment
- Industrial Washers
- Phosphate Coating Compounds
- PAINTBOND Compounds
- Aluminum Treating Compounds
- Alkali and Emulsion Cleaners
- Rust Proofing Materials
- Extrusion and Drawing Compounds
- Spray Booth Compounds

When DETREX pioneered solvent degreasing and introduced PERM-A-CLOR, more than a quarter of a century ago, it completely revolutionized metal cleaning. Today's PERM-A-CLOR is the finest of trichlorethylene products – the result of years and years of testing and proving, in the laboratory and on the job.

Combine PERM-A-CLOR with DETREX tailored-to-the-job equipment, and even greater efficiencies are realized. Operating costs are reduced, worker productivity is increased, more parts are cleaned per pound of solvent.

Now add the DETREX engineering organization – men most qualified to analyze and appraise the efficiency of metal cleaning operations – and you have another important reason why PERM-A-CLOR users get the most for their solvent dollar.

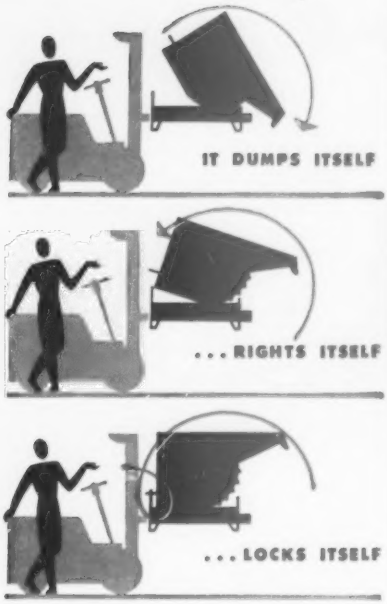
Write for T. J. Kearney's informative article: "Ultrasonics—an Outstanding Aid to Metal Cleaning"

DETREX CHEMICAL INDUSTRIES, INC.

Box 501, Dept. FM-859 Detroit 32, Michigan

World's Largest Exclusive Producer of Cleaning Chemicals and Equipment

For more facts Circle 495 on Reader Service Card



How to cut scrap handling costs 50%

Here's the fastest, lowest cost method of scrap handling ever devised. Hundreds of industries are now using Roura Hoppers instead of barrels or tote boxes to collect scrap metal. They're placed alongside machines or in strategic locations. When full, lift truck operator picks up loaded hopper . . . transports it to scrap bin or freight car . . . flips the latch . . . and the hopper automatically dumps its load, rights itself, locks itself. Hopper is returned to its station and operator is free for other work.

Segregation of scrap is simple. Hoppers can be marked for copper, brass, stainless, etc. Brings higher prices.

Roura Hoppers are made in five sizes, ½ to 2 yard capacities. Sturdily built of 3/16" steel plate with continuous arc-welded seams. Also available in stainless steel or galvanized. Mounted on live skids or a choice of wheels. Standard models available for immediate shipment from stock.

Start cutting costs now . . . with Roura Hoppers. *Remember . . . if it's as good as a Roura it IS a Roura.*

ROURA
Self-Dumping
HOPPER

HERE'S HOW to get more details about Roura Self-Dumping Hoppers. Just attach this coupon to your letterhead . . . sign your name . . . and mail to . . .

ROURA IRON WORKS, INC.
1423 Woodland Ave., Detroit 11, Michigan

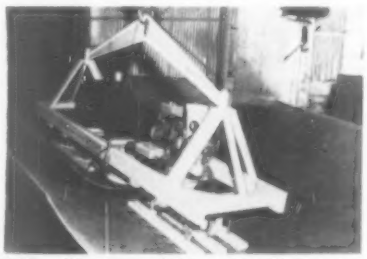
FACTORY / EQUIPMENT NEWS

Begins on page 86

For more about these items, circle item numbers on Reader Service Card next to back cover.

138—Conveyor Belt eliminates troughing idlers, carries more material faster than conventional belting. One-piece belting is molded in a flanged cross-section and pretensioned to flex as it passes around pulleys. In 8- to 48-in. widths, 1- to 3-in. flanges. *Monobelting Corp.*

139—Power "Buggy," walk-behind type, can be used in tight quarters. Features small radius turns, deadman brake. Comes with flat pallet bed for material such as brick. Rounded corners of bucket facilitate dump-out. In 1500-lb. (10-cu.-ft.) capacity. *Aeroil Products Co.*



140—Vacuum Lifter handles contour sheet metal as well as flat sheets. Grips both concave and convex surfaces. Lifting capacity: 1400 lb. on 36-in.-diameter domes, 2000 lb. on 72-in.-diameter domes. Gasoline-driven 8-ft. unit also adapts to electric motor. *Vac-U-Lift Co.*

Turn the page

Is your plant CRITICALLY SHORT of WATER?

You will make major water savings, reduce your costs, solve your problems of water supply or disposal and get HIGH OPERATIONAL EFFICIENCY with Niagara "Aero" Evaporative Heat Exchangers, After Coolers or Condensers for these important plant services or processes:

- AFTER COOLING and air drying for large air and gas compressors and AIR LIQUEFACTION
- COOLING ENGINES, COMPRESSORS, HYDRAULIC PRESSES
- COOLING QUENCH BATHS, FURNACES, INERT ATMOSPHERES
- COOLING ROLLS, WELDERS, DRAWING OR EXTRUSION DIES
- PRODUCT AND PROCESS COOLING CHEMICALS OR INTERMEDIATES
- COOLING LIQUIDS OR GASES IN CLOSED SYSTEMS
- VAPOR CONDENSING UNDER VACUUM
- ELECTRONIC PROCESS COOLING

High operational efficiency means: precise temperature for improved product and process quality control, heat removal at rate of input, simple operating conditions, real economy in upkeep, sustained full capacity.

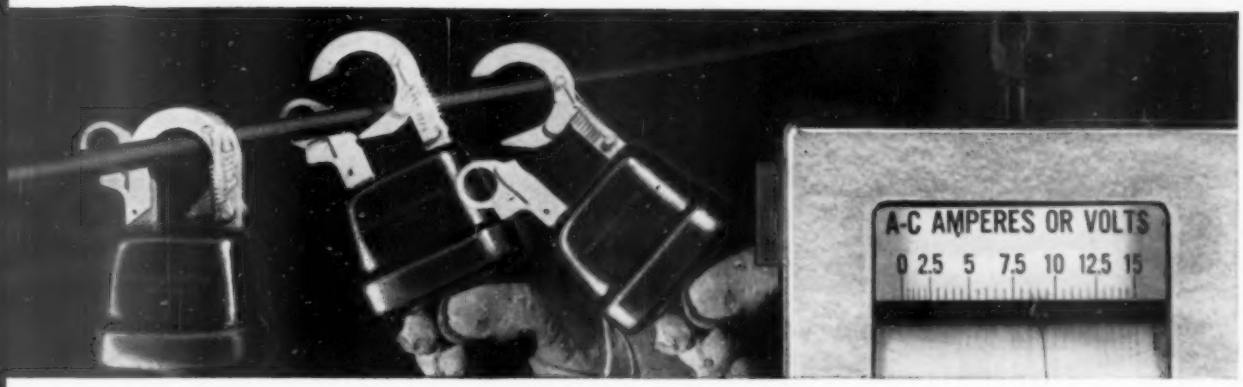
Also it means cooling in a closed system with your product kept free from contamination or, when condensing, getting a pure condensate holding high quality in your product or material.

Niagara machines do the work of a cooling tower plus shell-and-tube coolers with a single machine that saves piping, water handling disposal and treatment expense and 95% of water consumed by contact cooling methods.

Write for Bulletin 129, 130, 132, 136R.

NIAGARA BLOWER COMPANY
Over 35 years of Service in Industrial Air Engineering
Dept. F-8 405 Lexington Avenue
NEW YORK 17, N. Y.
District Engineers in Principal Cities of U. S. and Canada

hooks on, records dips, peaks...



This new General Electric Type CH-7 "hook-on" continuously records all transient dips and peaks up to 750 amps or volts without breaking the circuit or wasting production time. It's portable, inking . . . features throw-away inkwell, 0.7 second response time and 28 chart speeds. ***No power required*** . . . unattended, it operates 60 days indoors or outdoors from a hand-wound, spring-clock chart drive. And the butyl-molded hook-on transformer is now available in ***new 13.2 and standard 8.7 kv-rated insulation.*** Companion portable and switchboard models in the CH inking line record a-c and d-c volts and amps, a-c watts, vars, frequency, and d-c milliamps and millivolts. Or, for an inkless trace, General Electric's ***all-weather*** Type CF-7 portable recorder offers the same hook-on convenience. Indicating Type AK instruments, with trigger-operated hook, give ***quick, accurate readings.*** Range selector rotates with finger-tip pressure . . . only one scale shows at a time. For the complete "hook-on" story just contact your G-E Apparatus Sales Office or Distributor; or write direct to Section 592-103A, General Electric Company, Schenectady 5, N. Y.

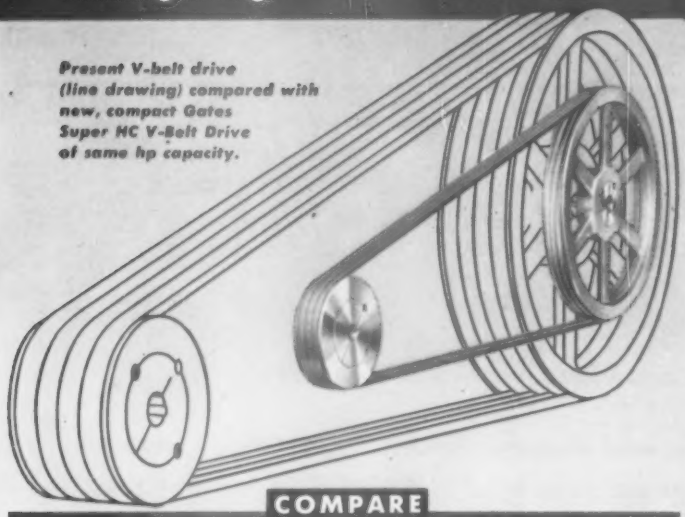
Other General Electric Instruments for Industry—*Switchboard and panel instruments, recorders, indicator and recorder controllers, pyrometers, timing devices, speed and color measurement equipment, laboratory test instruments.*

INSTRUMENT DEPARTMENT

GENERAL ELECTRIC

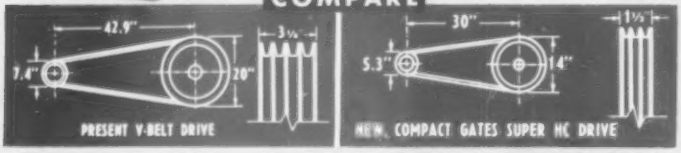
For more facts Circle 498 on Reader Service Card

Designing NEW DRIVES?



Present V-belt drive (line drawing) compared with new, compact Gates Super HC V-Belt Drive of same hp capacity.

COMPARE



Save up to 20%

with new high capacity V-belt drive

When you change the whole drive — both V-belts and sheaves — remember: The cost of a Gates Super HC V-Belt Drive is as much as 20% less than the cost of present V-belt drives of the same horsepower capacity.

A development of Specialized Research in the world's largest V-belt laboratories at Gates, the new Super HC V-Belt makes possible the most compact, lightest-weight, lowest-cost multiple V-belt drive you can put on any machine!

Cuts drive space as much as 50%

With Gates new Super HC V-Belt, sheave diameters and widths can be reduced 30% to 50%, center distances 20% and more. Bearing load is lightened and total space occupied by the drive may be cut as much as 50%.

"The Modern Way to Design Multiple V-Belt Drives" is an informative handbook on the Super HC Drive, available from your nearby Gates Distributor listed in the Yellow Pages of your phone book.

The Gates Rubber Co., Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ont.
World's Largest Maker of V-Belts

TPA 439

Gates SUPER HC V-BELT Drives

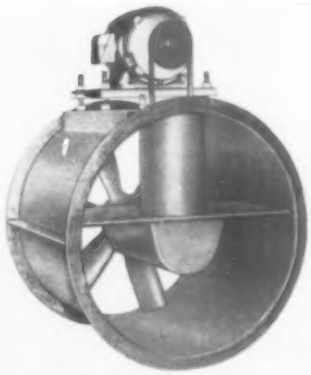
FACTORY / EQUIPMENT NEWS

Begins on page 86

For more about these items, circle item numbers on Reader Service Card next to back cover.

141—Package Unit Substation, 79½ x 94 x 36 in., moves easily through doorways. Requires minimum installation space. All components can be reached from front to allow placement against wall. In 75- to 300-kva. capacities, high voltages to 4800, low voltages to 600. *Square D Co.*

142—Flow Control Counter, 5-ft. long accessory to belt conveyor system, counts up to 35,000 consecutive cartons without miss. No need to space individual objects on line. Replaces manual counting or photoelectric device. Bed, 18 in.; belt, 14 in. *Rapids-Standard Co.*



143—Belt-Drive Duct Fans made of glass fiber provide low-cost resistance to corrosion equal to that of all-stainless steel or all-monel units. Only drive shaft and hardware are stainless steel. Variable pitch drive. In 20- to 24-in. diameters. *Hartzell Propeller Fan Co.*

For more about these items, circle item numbers on Reader Service Card next to back cover.

144—Vacuum Power Attachment for lift trucks has four suction cups, each holding up to 300-lb. weight. Can be mounted on gas or electric-powered truck. Eliminates clamps, forks, or pallets, thus increasing maneuverability. Cups adjust hydraulically. *Yale & Towne Mfg. Co.*

145—Electronic Counter fills speed and cost gap between mechanical and ultra-high speed counters. Low-cost unit functions accurately at speeds up to 3000 counts per minute. Transistorized and equipped with printed circuitry. Plugs into 105-125 v. *Veeder-Root, Inc.*

146—Mobile Two-Way Radio comes in 10-, 30-, and 75-watt models. Latter drains only 0.040 amp. from battery on standby—no more than car clock. Modular construction permits carrying spare parts for field repairs. Transistorized, easily maintained. *General Electric Co.*

Turn the page

Improved Gates Vulco Rope gives you 2 important advantages

1. 40% higher hp rating at no increase in price: This important cost-saving advance is the result of Specialized Research in the world's largest belt-testing laboratories at Gates. **As replacements on standard drives these V-belts with 40% more load-carrying ability give longer service life...reduce down-time, cut belt replacement costs.**

2. Concave Sides (U. S. Pat. 1813698): The sides of Gates Belts are concave (Fig. 1). When the belt is bent around the sheave, the concave sides fill out—become straight—for full, uniform contact with the sides of the sheave groove (Fig. 2). Uniform contact insures maximum pulling power...even distribution of wear...longer life.

Fig. 1

Fig. 2

Available in all sizes from your nearby Gates V-Belt Distributor listed in the Yellow Pages of your phone book.

When designing new drives
use Gates new Super HC V-Belts and Sheaves.
See opposite page.

The Gates Rubber Co., Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ont.

World's Largest Maker of V-Belts

Gates

TPA 432

Gates Hi-Power VULCO ROPE V-Belts

Available NOW for the FIRST TIME

DEPENDABLE MATERIALS HANDLING EQUIPMENT

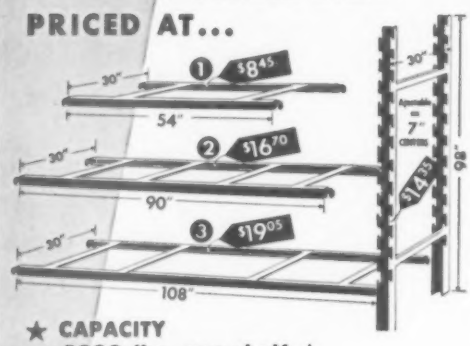
STANDARD SIZE PALMER-SHILE Adjustable STORAGE RACKS

SERIES 60

Pat. App. for

- 3 SHELF SIZES
- 1 PANEL SIZE

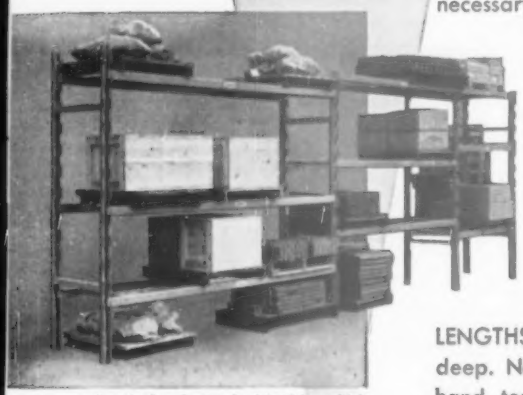
PRICED AT...



★ CAPACITY 5000 lbs. per shelf ★

★ IMMEDIATE DELIVERY FROM STOCK ★

JUST TWO STEPS—SET UP PANELS SNAP SHELVES IN POSITION



Standard racks can be joined in multiple sections of the same shelving length, or any combination. Shown here are sections with the three different shelving sizes, adjusted to various storage openings.

LOW COST P-S Standard Series 60 Racks are ideal where fast action is necessary to solve your storage problem. Built of sturdy steel channel they are capable of handling almost any kind of materials and merchandise on pallets, skids, boxes or barrels. Come in four pieces—A. Vertical PANEL 8½′ high, 30″ deep and 2½″ wide with shelves adjustable to 7″ centers. B. THREE DIFFERENT SHELF LENGTHS 4½′, 7½′ and 9′ each 30″ deep. No small parts, set entirely by hand, top shelf can be flush. Standard racks can be joined in multiple sections of the same shelving lengths, or any combination.

Can be built to customer specifications

DESIGNED AND MANUFACTURED BY

Palmer-Shile Co.

16007 FULLERTON AVE., DETROIT 27, MICH.

144 Old Colony Ave., BOSTON 27, Mass., ANdrew 8-3634 • 1209 Burlingame Ave., BURLINGAME, Calif., Diamond 2-0823 • 15 South Austin Blvd., CHICAGO 44, Ill., AUstin 7-8599 • 1400 Ruth Drive, DENVER, Colo., ATlas 7-5255 580 East 200th Street, EUCLID, Ohio, IVanhoe 6-3150 • 202 Genesee Bank Bldg., FLINT, Michigan, CEdar 8-6881 2609 S. Broadway, FORT WAYNE, Indiana, KEnmore 5408 • 1224 No. Capitol Ave., INDIANAPOLIS 2, Indiana, MElrose 5-2587 • 6440 Fleet St., LOS ANGELES 22, Calif., RAymond 3-3733 • 647 W. Virginia St., MILWAUKEE 4, Wis., BRoadway 1-9860 • 5107 Columbia Ave., ST. LOUIS 9, Mo., PRospect 1-1474 • 199 Main St., WHITE PLAINS, N. Y., White Plains 6-1354.

Export Division—75 West Street, NEW YORK 6, N. Y.

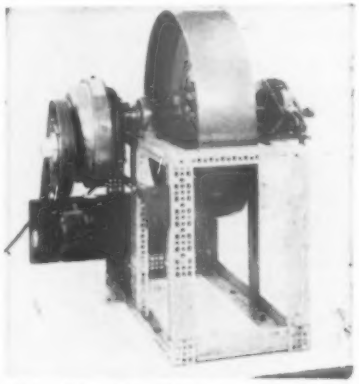
FACTORY / EQUIPMENT NEWS

Begins on page 86

For more about these items, circle item numbers on Reader Service Card next to back cover.

147—Solenoid Air Valve, which can be hand-actuated, allows easy checking of operational failures in low-pressure (to 150 psi.) control systems without halting production. Useful in die-setting and clamping. Manual lever can be wired against actuation. *Barksdale Valves.*

148—Manual Holder for Heliwelding (tungsten-inert-gas welding process) is shaped like a cigar and held like a pencil. Rated at 100 amp., it's ideal for work in hard-to-reach places. Good for metals ⅛-in. thick and under, including aluminum and magnesium. *Air Reduction Co.*



149—Speed Reducer, with adjustable torque arm, eliminates auxiliary motor rails for belt take-up. Input shaft, offset from output hub, simplifies take-up of belt stretch from primary drive. Two reduction ratios —13:1, 20:1; six capacities to 40 hp. *American Pulley Co.*

Turn the page

Time is money to YOU, too!

Like the organizations named here, you can save time, boost efficiency with a PAGEMASTER® *Selective Radio-Paging System* by Stromberg-Carlson.

Whether your organization numbers fewer than a hundred people—or many thousands—you can have a system engineered to meet your particular requirements. PAGEMASTER serves with equal effectiveness in industrial plants, hospitals, department stores, construction projects, hotels, oil fields, stadiums—to name just a few examples.

A PAGEMASTER system is compact and easy to install. It consists of three basic components: transistorized receivers that fit easily in jacket or shirt pocket; an encoder, about the size of an adding machine, located next to your telephone switchboard and used by the operator to signal holders of receivers; and a transmitter. Systems are available for lease or purchase.

For details, contact the PAGEMASTER distributor in your area, or write to us at 203 Carlson Road.

Several excellent territories still open. Distributor inquiries welcome.

"There is nothing finer than a Stromberg-Carlson"

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

Pagemaster Sales • Rochester 3, N. Y.

Electronic and communication products for home, industry and defense

S-C GD

◀ For more facts Circle 501 on Reader Service Card

For more facts Circle 502 on Reader Service Card

TORIT DUST COLLECTION ENDS THIS:

"OUT OF PRODUCTION FOR THREE DAYS? THAT'S WHEN WE'RE SUPPOSED TO SHIP!"

"And believe me, that wasn't all the boss said! Two key machines were so clogged with dirt and grime we had to disassemble and clean them—overnight! Between overtime for the repair crew and our own crew, I managed a partial shipment in three days. And I made up my mind this wasn't going to happen again!

"I'd heard of preventive maintenance with Torit Dust Control equipment—and the Torit representative I called sure opened my eyes! Clean machines hold close tolerances better and up to 80% longer! Torit collectors remove over 99% of dust and air-borne debris, save on both the cost and frequency of servicing.

"I expected there'd be a hitch on prices—but look what I found out: our production breakdown cost nearly as much as the Torit equipment we needed! And just while Torit Dust Collectors are being depreciated we'll make money on them—through maintenance savings, improved production, and reduced down-time!

"The boss actually congratulated me when I showed him the savings Torit preventive maintenance gives us!"

Torit Dust Collectors stop dust build-up before it costs you money. They're available in both high efficiency cyclone and cabinet type units. Why not check into them today—write:

TORIT manufacturing company

Walnut & Exchange Streets, St. Paul 2, Minn. Dept. 320

For more facts Circle 503 on Reader Service Card

FACTORY / EQUIPMENT NEWS

Begins on page 86

For more about these items, circle item numbers on Reader Service Card next to back cover.

150—Platform Hi-Lift Truck stacks skid and box loads to upper level, handles sheet stock or other bulky item not adaptable to pallets. Capacity 4000 to 6000 lb. Powered by 12-volt system. Lifting and lowering pushbutton controls are in handle. *Barrett-Cravens Co.*

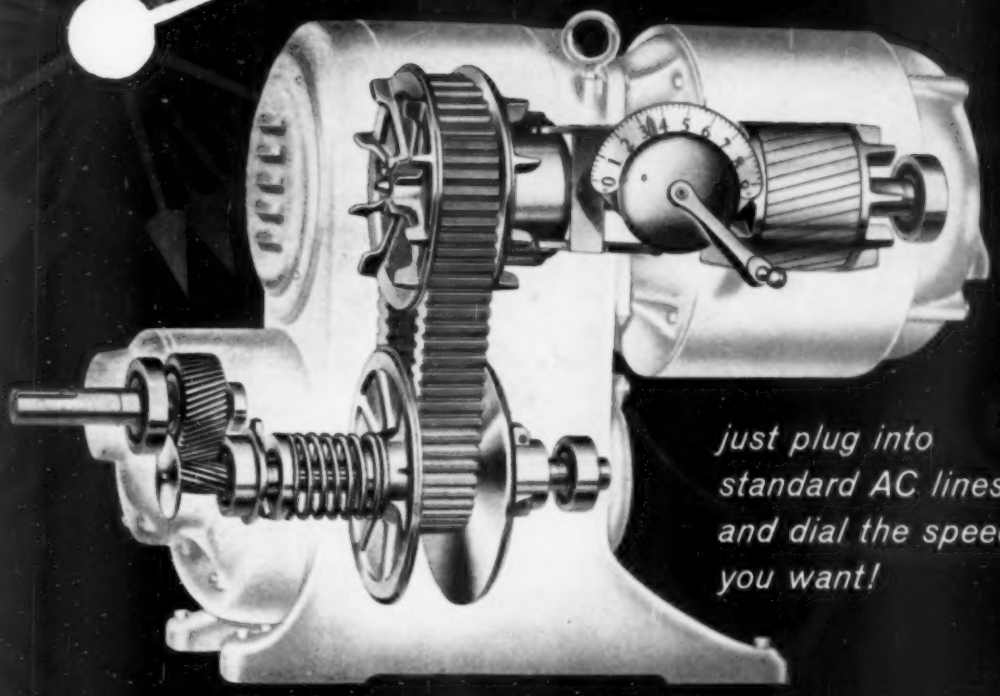
151—Electrolytic Marker, using specially prepared stencils, etches 0.003-in.-deep mark in 15 sec. on ferrous metals. Can also be used on non-ferrous metals and alloys. This no-impact etching is ideal for thin cross-sections or small, delicate parts. *Lectroetch Co.*

152—Liquid Level Detector, consisting of a Gamma-switch and a lead-shielded holder with radioactive material, sounds alarm when high or low level is reached in tank. Never touches material in tank. Powered by 115 volt a-c, 60 cycles, 0.5 amp. Under $500. *Ohmart Corp.*

153—Heat Generator, producing 850,000 Btu. per hr., comes in stationary, 3-wheeled, or trailer-mounted models. Choice of burners for oil, gas, or LPG, and either electric motor or gasoline-engine driven pumps. Requires no licensed operator. *Homestead Valve Mfg. Co.*

Turn the page

any RPM simply on AC!

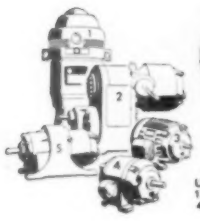


just plug into standard AC lines and dial the speed you want!

U. S. VARIDRIVE Motors

...one unit...infinite speeds!

So *simple* to get any speed you want, directly from standard AC power lines—with U.S. VARIDRIVE MOTORS! One compact, self-contained unit does it. With U.S. VARIDRIVE, you don't have to buy a DC converter, DC generators, complicated and delicate electronic circuits. Just *plug in* this one simple unit—dependable, easy for your regular personnel to maintain. You merely dial, and get smooth, stepless speed changes immediately! Thus, you set speeds for maximum production as needs vary...*increase* machine efficiency...output...product quality! *Decrease* costs...rejects...manpower and materials waste! Available in RATINGS: ¼ to 75 H.P. Specify: "U.S. VARIDRIVE MOTOR."



U.S. MAJOR MOTOR LINES INCLUDE:
1. Vertical Solid & Hollowshaft, 2. Varidrive, 3. Totally-Enclosed, 4. Unicloseal, 5. Syncrogear. Also, many other special motors.

U.S. ELECTRICAL MOTORS INC.

BOX 2058, LOS ANGELES 54, CALIFORNIA
OR MILFORD, CONNECTICUT

FREE COLOR BROCHURE
...Send for U.S. Varidrive Bulletin No. 1797

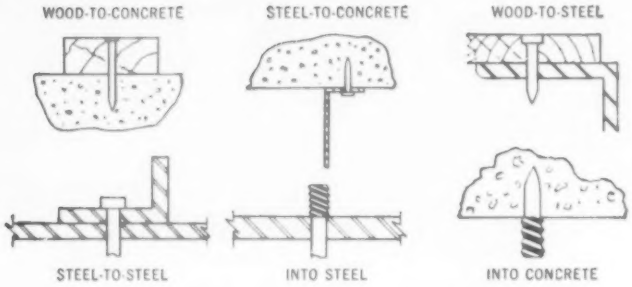
For more facts Circle 504 on Reader Service Card

ONLY RAMSET

"covers all the bases in powder-actuated fastening"

This statement has been made by hundreds of contractors, architects, electricians, plumbers, maintenance men, supervisors, foremen and others over the past ten years! Whatever the job, if it involves fastening into concrete or steel Ramset can do it more easily, efficiently, and with a lower in-place fastener cost.

Threaded studs, drive pins, eye pins—over 100 specialized fasteners team with ten types of powder charges to assure you of just the right holding power for each job. It will pay you to get more details. Your Ramset dealer is listed in the Yellow Pages under tools . . . call him today!



In addition to powder-actuated fastening, the versatile Ramset® System includes Shure-Set® hammer-in tools for light fastening, and Ringblaster® heavy-duty kiln gun.

Ramset® Fastening System

WINCHESTER-WESTERN DIV. • OLIN MATHIESON CHEMICAL CORPORATION
12155-H BEREA ROAD • CLEVELAND, OHIO

FACTORY / EQUIPMENT NEWS

Begins on page 86

For more about these items, circle item numbers on Reader Service Card next to back cover.

154—Strapping Machine squeezes paper, multiwall bags, textiles, and corrugated cartons into compact, solid mass, then straps them into bales. In 6000- and 16,000-lb. compression capacities. Built-in turntable positions load two ways for strapping. *Signode Steel Strapping Co.*

155—Vibratory Signal Horn can be adjusted from barely audible buzz to loud noise (101-103 decibels at 10 ft.). Adapts to production and storage needs, office and cafeteria facilities, etc. Basic unit fits into 4-in. square electrical outlet box. *Federal Sign & Signal Corp.*

156—Warning Light, with dome head, flashes with full 360-deg. visibility. Built-in "Solarstat" automatically turns light on when sun goes down, and off at daybreak. Flash rate is adjustable. Battery lasts 6 months. Neon or incandescent transistor models. *Pacific Mercury.*

Turn to page 108

For more facts Circle 505 on Reader Service Card

For more facts Circle 506 on Reader Service Card ➤

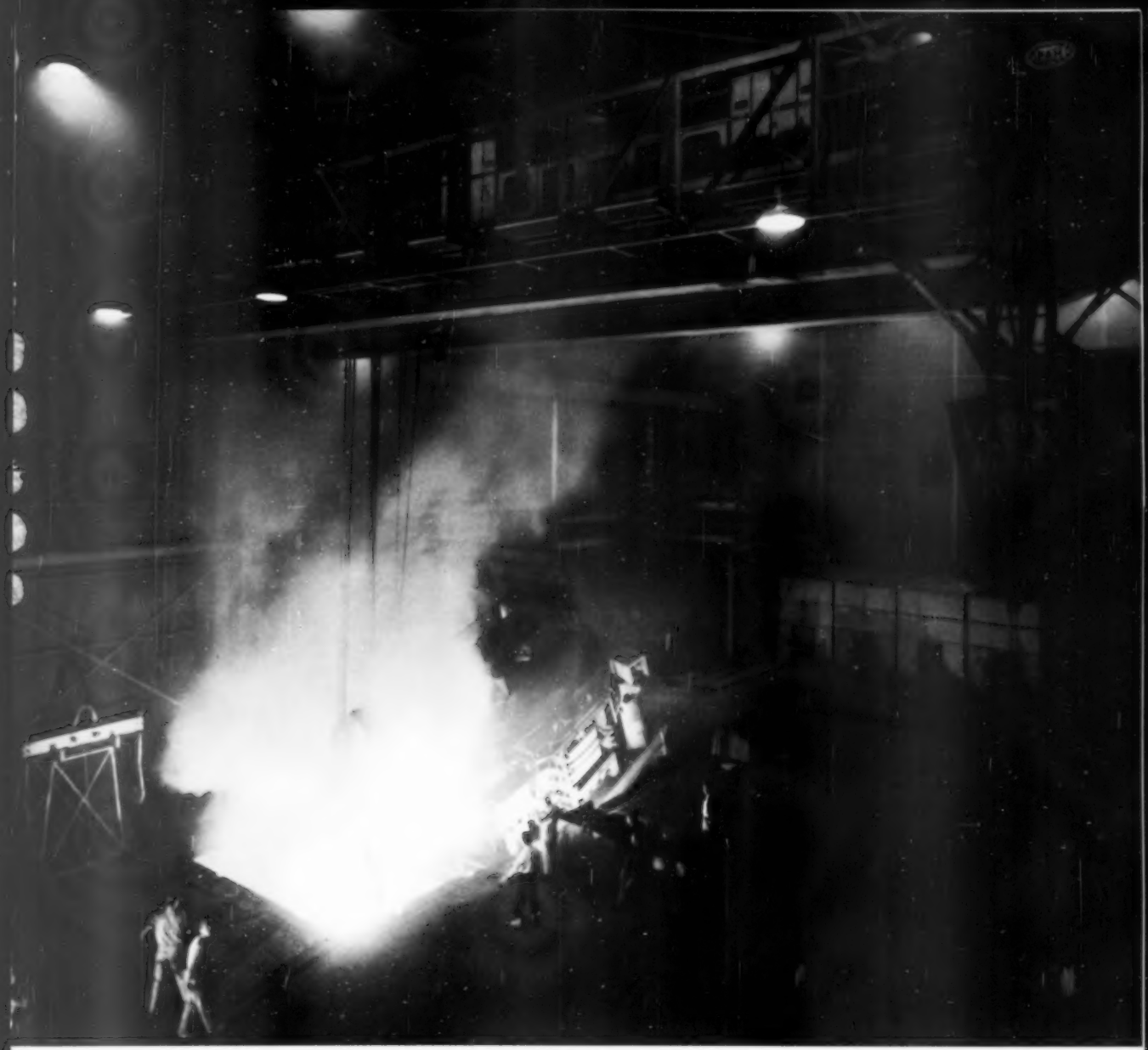


Photo Courtesy Eastern Stainless Steel Corp., Baltimore, Md.

FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING...

IN STEEL MILLS: This rugged 100-ton giant proves that P&H builds a true steel-mill crane which is *specifically designed* for steel mill use.

P&H steel-mill cranes are bigger and heavier. Their design combines brute strength and special metallurgy for lasting vertical and lateral stability. Each unit is engineered to easily handle constant massive loads — to shrug off strains and stresses of frequent shock loads — and to resist the terrific blasts of heat without effect on crane parts and structural supports. No disrupting your production when you use P&H!

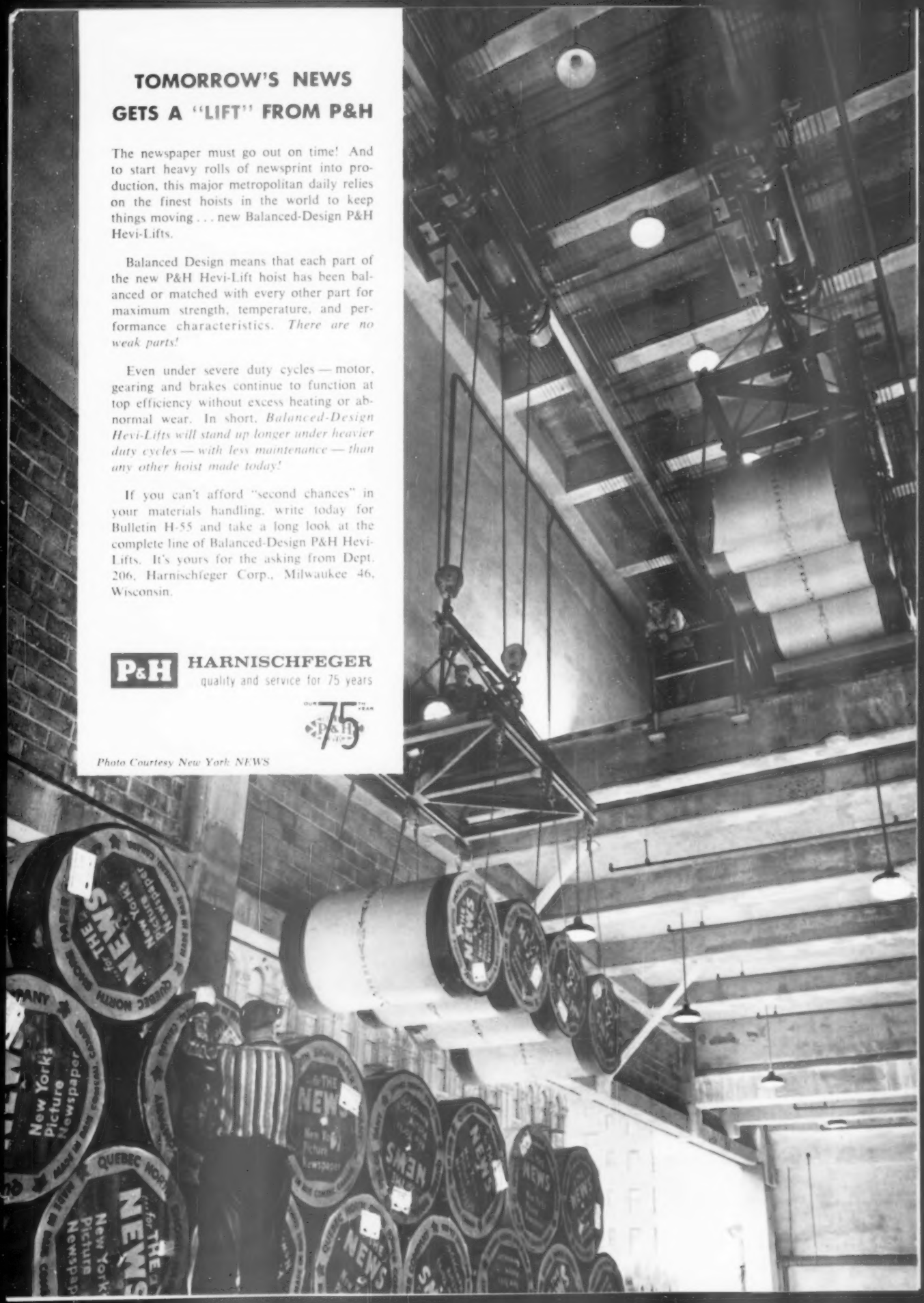
Equally important to you — P&H is the *only* crane manufacturer that makes the *entire* crane . . . including all structural, mechanical, and electrical parts . . . and then gives you guaranteed one source responsibility. *Remember that* . . . the next time you buy a crane on which your mill production will depend! For more information, write for Bulletin C-42, Dept. 107, Harnischfeger Corp., Milwaukee 46, Wisconsin.

P&H

HARNISCHFEGER

...quality and service for 75 years

75



TOMORROW'S NEWS GETS A "LIFT" FROM P&H

The newspaper must go out on time! And to start heavy rolls of newsprint into production, this major metropolitan daily relies on the finest hoists in the world to keep things moving . . . new Balanced-Design P&H Hevi-Lifts.

Balanced Design means that each part of the new P&H Hevi-Lift hoist has been balanced or matched with every other part for maximum strength, temperature, and performance characteristics. *There are no weak parts!*

Even under severe duty cycles — motor, gearing and brakes continue to function at top efficiency without excess heating or abnormal wear. In short, *Balanced-Design Hevi-Lifts will stand up longer under heavier duty cycles — with less maintenance — than any other hoist made today!*

If you can't afford "second chances" in your materials handling, write today for Bulletin H-55 and take a long look at the complete line of Balanced-Design P&H Hevi-Lifts. It's yours for the asking from Dept. 206, Harnischfeger Corp., Milwaukee 46, Wisconsin.

P&H **HARNISCHFEGER**
quality and service for 75 years

OUR 75TH YEAR

Photo Courtesy New York NEWS

It's a Snap

The Fenwal 541 Temperature Indicator Controller

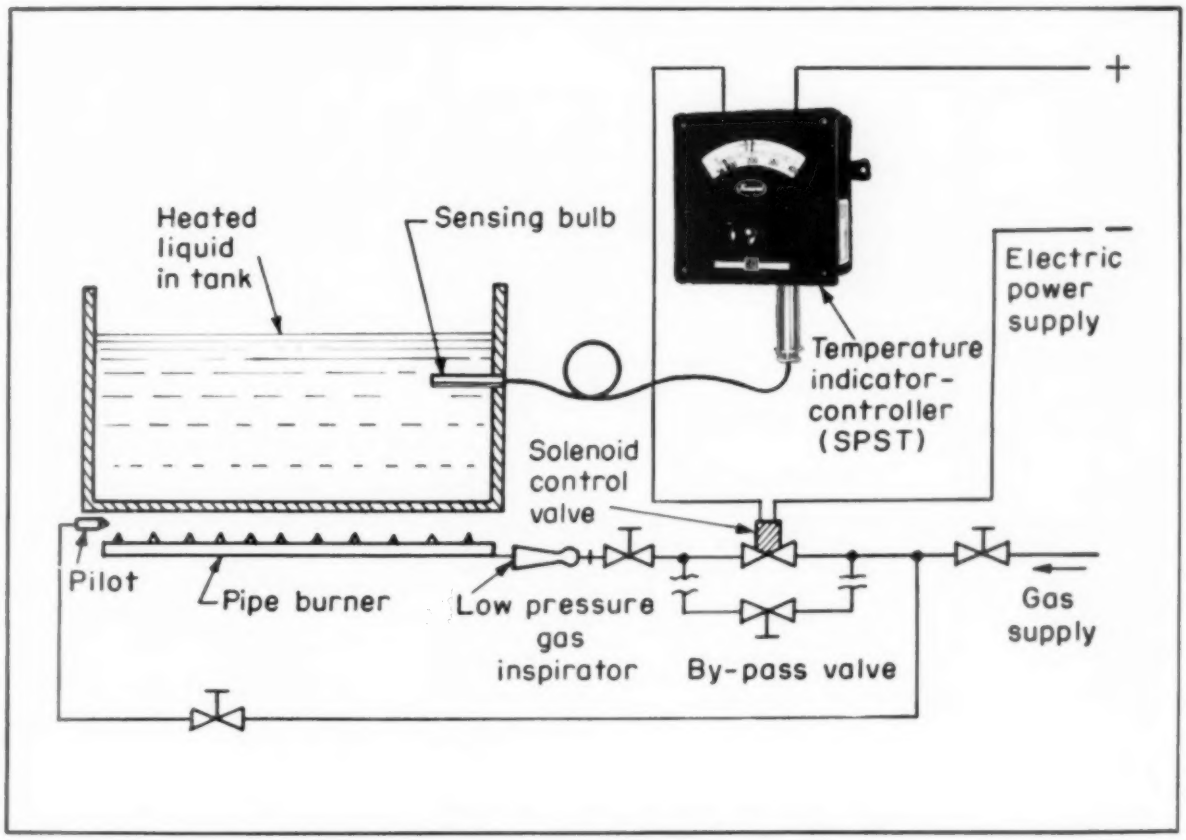
is simple to install, operate, and maintain!

There's no easier way to be sure of precise, economical heat control in simple process systems than with a Fenwal 541 Temperature Indicator Controller. Installs in minutes . . . sets with a turn of the control knob . . . control switches can be replaced without even disturbing internal mechanism. *You can't go wrong!*

Installation on atmospheric gas burner (below) is typical. The 541 is available with a wide choice of bulb styles and hundreds of combinations to meet widely varying process requirements. Welded steel case protects against splashing and dust. All moving parts operate in opposition . . . compensate for wear and keep accuracy high. *You don't have to baby this controller!*

Available in 5 different temperature ranges within the span of −150° to +700°F, the 541 can control as many as four circuits simultaneously! Current ratings: 15 and 20A-125-250VAC; .50A-125VDC; .25A-250VAC. For full details see your Fenwal Distributor. For application data sheets, write Fenwal Incorporated, 258 Pleasant Street, Ashland, Massachusetts.

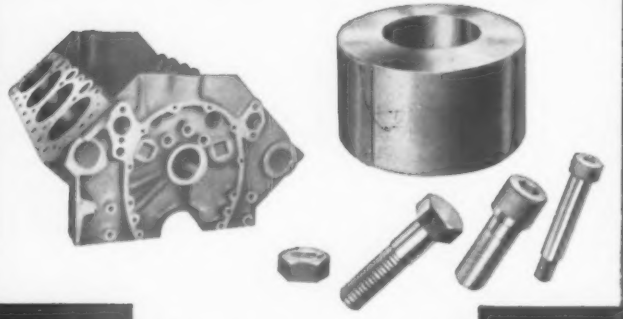
The Fenwal 541 Temperature Indicator Controller provides economical, highly accurate control of heat in this atmospheric gas burner system. Rugged liquid filled sensing bulb and capillary tube activate control of gas supply.



ANOTHER EXAMPLE OF HOW **Fenwal** CONTROLS TEMPERATURE . . . PRECISELY

For more facts Circle 507 on Reader Service Card

VALVOLINE
Tectyl
protects metals
against RUST



VALVOLINE'S amazing Tectyl rust preventives protect metal surfaces against *every kind of rust and corrosion* during storage and shipping.

Low-cost Tectyl compounds are easy to apply by brush, spray or dip and just as easy to remove. They protect metal surfaces against . . . sun and rain . . . heat and cold . . . salt air and salt water . . . humidity, perspiration and corrosive fumes.

Tectyl rust preventives meet exacting government specifications.

Write today for these two helpful Tectyl charts

1. "Valvoline Tectyl U. S. Government Approved Packaging and Preservative Chart." Gives the Army, Navy and Air Force "Specs" and applications.

2. "Valvoline Tectyl Industrial Rust Preventive Comparison Chart." Specifies applications covering the entire field.

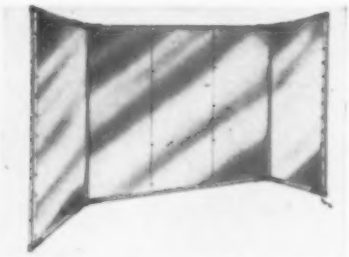
VALVOLINE
Tectyl ALL-METAL PROTECTION
RUST PREVENTIVES

VALVOLINE OIL COMPANY, Freedom, Pennsylvania
Division of Ashland Oil & Refining Company

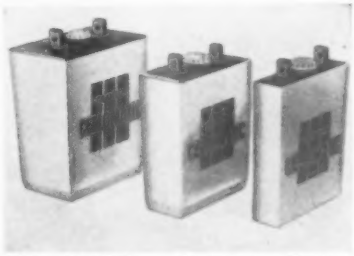
FACTORY / EQUIPMENT NEWS

Begins on page 86

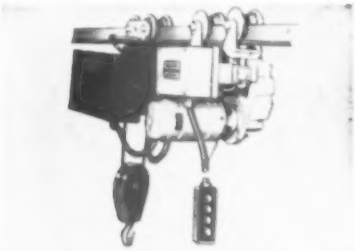
For more about these items, circle item numbers on Reader Service Card next to back cover.



157—Heat Screens of aluminized asbestos cloth protect against fire and heat. For areas where spark, flash, and heat endanger personnel and equipment. Ideal for welding. Comes in 3, 4, or more sections, 5- and 6-ft. heights, a variety of widths. *Frommelt Industries.*



158—Modular Storage Battery comes in three basic cells with amp.-hr. capacities of 220, 125, and 75. Simplifies purchasing, maintenance, and inventory operations. Permits varied cell arrangements for any voltage, amperage, weight, or shape. *Scranton Cellomatic Battery Corp.*



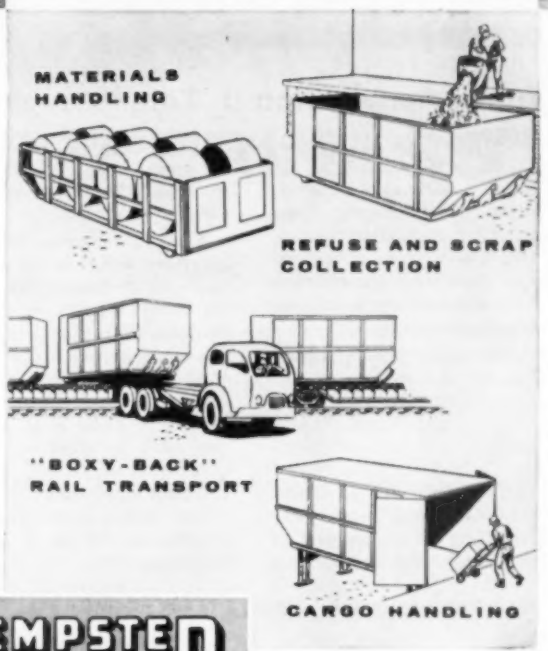
159—Monorail Drive provides electrically powered travel for hoists or other carriers along monorail system. Handles loads to 5 tons at speeds to 2000 fpm. For any monorail track with clear undersurface. Pushbutton type, pendant controls. *Becker Crane & Conveyor Co.*

Turn the page

DEMPSTER® DINOSAUR®...Picks Up 40 Cubic Yard Detachable Containers–15 Ton Loads

The System of a Hundred Uses

Here's the detachable container system of a hundred uses. The simple, powerful, one-man DEMPSTER-DINOSAUR automatically picks-up . . . hauls . . . dumps . . . puts down . . . or pushes off on dock, loads limited only by the size of the truck or by highway restrictions. All handling operations are performed without the driver leaving the cab . . . no cables to hook on . . . no chains . . . . . . sheaves . . . winches. Models available for single or tandem axle chassis . . . 22,000 to 30,000 pound gross loads. Containers, six to 40 cu. yds. and over, available for refuse, scrap, materials handling, cargo, "boxy-back" rail shipments and many other uses. Write today for brochure or for a demonstration in your city.



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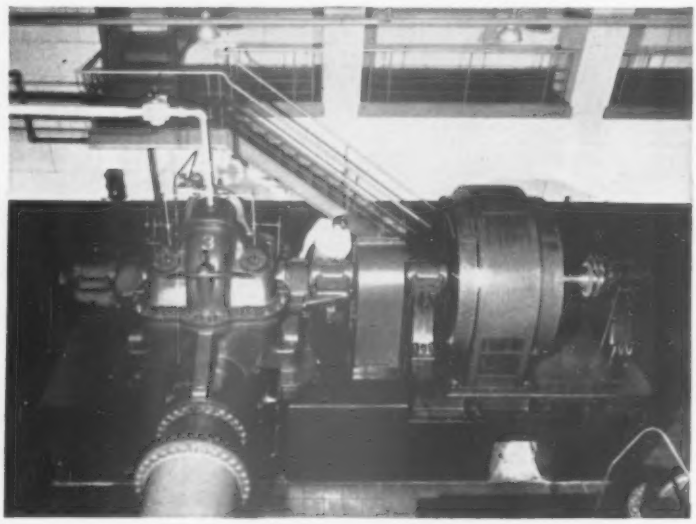
For more facts Circle 509 on Reader Service Card

A case for F-M Split-Case Centrifugals!



Typical installation in Toledo averages 80.314% wire-to-water efficiency for year!

Exceptionally high and dependable efficiency with steady, low-cost operation year after year—that's the report from a host of municipalities and industries using Fairbanks-Morse pumps in their pumping stations.

Why? Ask stations like Collins Park High Service in Toledo, O., where five Fairbanks-Morse 36-in. Split-Case Centrifugal Pumps have been giving superb performance for 17 years. The No. 3 pump in the photo pumped 6,065,590,000 gallons in one year alone, handling 26.13 percent of the plant total, and consuming just 3.55 kilowatts hours per million foot gallons!

Your Fairbanks-Morse Field Engineer welcomes you to inspect many other reports like this from his files—reports revealing why no other manufacturer can match the experience of Fairbanks-Morse in providing pumps and drivers for both municipality and industry. Your F-M Field Engineer will be glad to work with your own engineers in selecting the best equipment for your specific requirements. Write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

See Sweet's Product Design Catalog File for complete F-M Pump Line.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • ELECTRIC MOTORS • DIESEL, DUAL FUEL AND GAS ENGINES
LOCOMOTIVES • COMPRESSORS • GENERATORS • MAGNETOS • HOME WATER SYSTEMS

For more facts Circle 510 on Reader Service Card

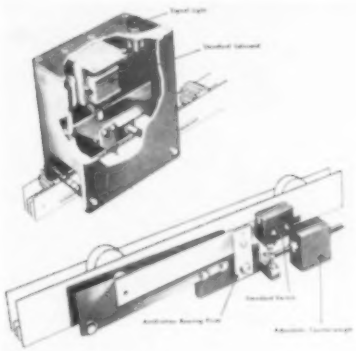
FACTORY / EQUIPMENT NEWS

Begins on page 86

For more about these items, circle item numbers on Reader Service Card next to back cover.

160—"Magni-Lite" with halo magnifies and illuminates point of work with less eye fatigue. Consists of 22-watt fluorescent lamp surrounding a distortion-free, color-corrected magnifying lens 5 in. in diameter. Comes with single or double extendable arms. *O. C. White Co.*

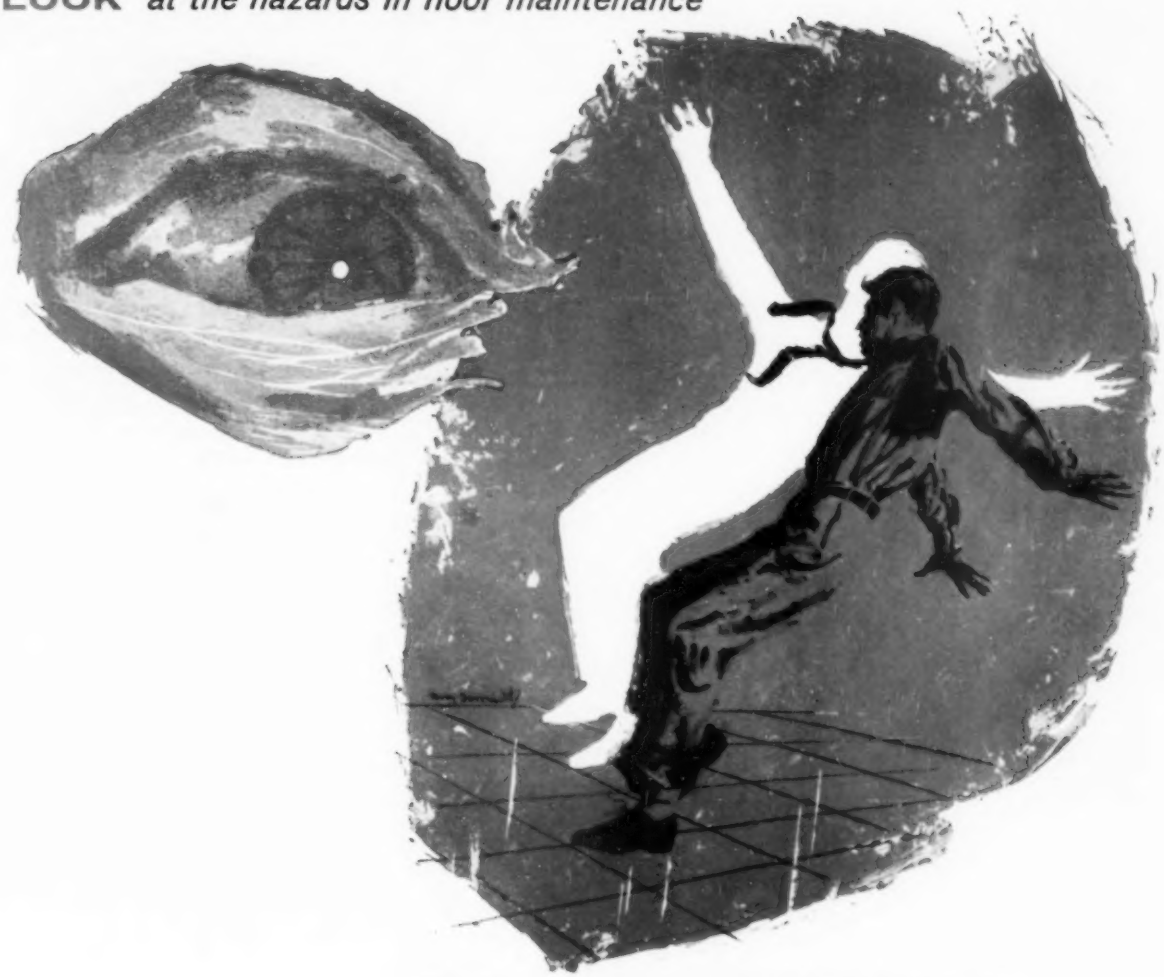
161—Gate Valve, with no internal stops, minimizes problem of slurry material clogging interior. Also prevents material from packing when valve is being opened or closed. Should it clog, air, steam, or water can be injected into purge holes. In 4-in. sizes. *Everlasting Valve Co.*



162—Interlock controls and coordinates chuted parts flow in automated handling systems. "Line Switch" type signals accumulation of parts at given point to control machine, fixture, or handling function. "Shot Bolt" type permits or prevents parts flow. *F. Jos. Lamb Co.*

Turn the page

LOOK *at the hazards in floor maintenance*



SLIPPERINESS

Taking slipperiness out of your floors is worthwhile insurance against slips and falls.

It's easily done with a specially blended West resin emulsion. This safe, high-traction finish contains no wax — yet produces a glossy, hard, durable film on all types of floors.

Slipperiness is only one of many floor problems. Others are just as common. Staining. Dirt retention. Excessive dust. High labor costs. To name a few. All can be prevented — often at reduced cost — with a complete WEST FLOOR CARE PROGRAM.

The WEST FLOOR CARE PROGRAM consists of three basic steps. Cleaning. Sealing. Maintaining. Each adapted to the individual needs of floors by West Representatives who specialize in methods as well as materials.

We'd be glad to show you how a WEST FLOOR CARE PROGRAM protects floors, modernizes methods, eliminates hazards. Write, or telephone your local West office.

Programs and Specialties for
Protective Sanitation and Preventive Maintenance

WEST CHEMICAL PRODUCTS INC.

WEST DISINFECTING DIVISION

WEST CHEMICAL PRODUCTS INC., 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Casgrain Ave., Montreal

☐ Please send your 32-page booklet, "The Proper Care of Floors."

☐ Please have a West Representative telephone for an appointment.

Name_____

Position_____

Mail this coupon with your letterhead to Dept. 14

For more facts Circle 511 on Reader Service Card

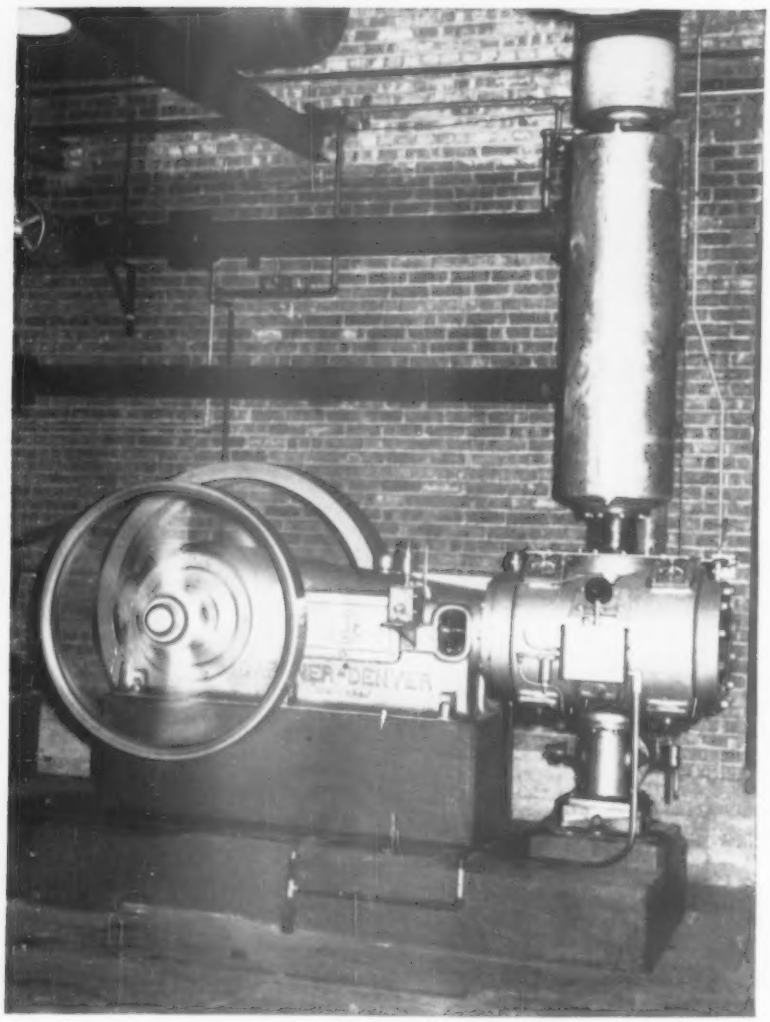
EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER DENVER

For continuous compressed air power, install the Gardner-Denver RX compressor. It assures years of reliable service . . . requires only routine attention. The sturdily engineered, dirt-free power end—that's one reason. And behind the scenes at Gardner-Denver, cleanliness in every step of assembly is another key to endurance. Rigorous testing assures years of efficient, trouble-free performance. Get the full story on RX superiority for 'round-the-clock service. Write for Bulletin HAC-40. Gardner-Denver Company, Quincy, Illinois.

Built for the long run

Gardner-Denver RX



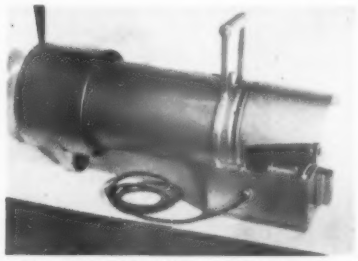
For more facts Circle 512 on Reader Service Card

FACTORY / EQUIPMENT NEWS

Begins on page 86

For more about these items, circle item numbers on Reader Service Card next to back cover.

163—Portable Coolant System, for milling, tapping, and similar metal-cutting operations, speeds production, saves tools, cuts operating costs. "Custamist" fine-fog unit comes in one to four outlet systems. Uses standard airline; needs no special training. *Custamite Corp.*



164—Portable LP-Gas Heater, rated at 200,000 Btu., produces high volume of quiet, sootless, odorless heat. Compact, it weighs only 45 lb. Burner control turns off fuel if power fails or gas flow is interrupted. Heat output is regulated by valve handle. *Muller Machinery Co.*

165—Lifting Platform, custom-built to any size or capacity, works automatically to feed and "receive" conveyors, presses, stamping and paper machines, etc. Pre-set controls raise, lower, and stop. Platform rolls to position needed. Folds flat when not in use. Requires minimum maintenance. *Autoquip Corp.*

FACTORY / EQUIPMENT NEWS

Begins on page 86

For more about these items, circle item numbers on Reader Service Card next to back cover.

166—Mobile Platform Scale, with 1000-lb. capacity, has enclosed wheels for safety and cleanliness. Offset pillar reduces over-all width and increases maneuverability. Other features include recessed counterpoise; self-aligning steel "V" bearings. *Fairbanks, Morse & Co.*

167—Hydraulic Pumps are for fire-resistant fluids, where flammable oils are dangerous—as in die-casting, welding, forging. Single pumps in 3, 5, 8, and 12 gpm., or these in any combination as double pumps; also 20, 30, 40 gpm. single pumps. *Brown & Sharpe Mfg. Co.*

168—Sump Pump is submersible combination pump and motor unit in compact, totally sealed, oil-filled case. "Demersible" unit can be lowered quickly into sump pit for temporary service, or permanently installed for continuous service. Capacity: 15-700 gpm. *Deming Co.*

Turn the page

Speedy air tools

tighten down on production costs

Cutting assembly-line time and costs, this Gardner-Denver air-powered screw driver quickly and efficiently spins screws tight in the manufacture of car radios. Note another production-booster here, too: a Gardner-Denver tool balancer—keeps tool within easy reach, reduces fatigue. These are typical examples of how Gardner-Denver hand-held air tools keep pace with fast-moving assembly work—cutting costs day in and day out. Write today for air tool bulletins.

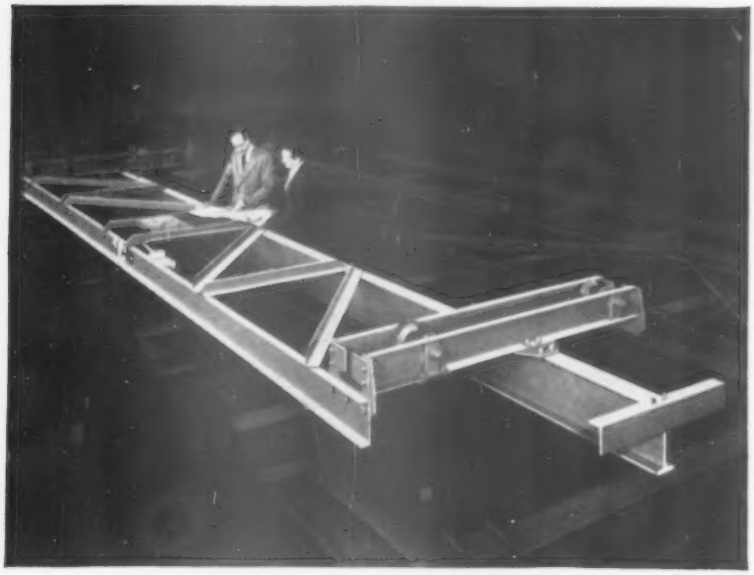
EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

For more facts Circle 513 on Reader Service Card

as MAINTENANCE FREE as CRANES can be...



ABELL-HOWE

UNDERHUNG CRANES

NOW WITH FORGED ALLOY STEEL WHEELS, GEARS AND PINIONS

another
ABELL-HOWE
plus
"QUICKLOCK"
WHEEL ASSEMBLIES
Combine positive wheel mounting with immediate removability. To remove axle, simply loosen two nuts, twist axle 90° and pull it out. Wheels, too, are as easily removed with no dismantling of truck frame. "QUICKLOCK" is exclusive with Abell-Howe.

Only Abell-Howe offers you forged steel dependability at all critical points of wear—wheels, gears *and* pinions! Furthermore, Abell-Howe rugged outrigger construction keeps bridge in square—provides lateral bracing for bridge girder. Smooth fluid drive provides cushioned starts whatever the load—reduces reversing shocks. To further assure smooth operation and lasting service, anti-friction bearings used throughout—with double row ball bearings in end truck wheels. Here's crane value that can't be beat!

ASK FOR BULLETIN

ABELL-HOWE COMPANY *7767 W. Van Buren St., Forest Park, Illinois*

FACTORY / EQUIPMENT NEWS

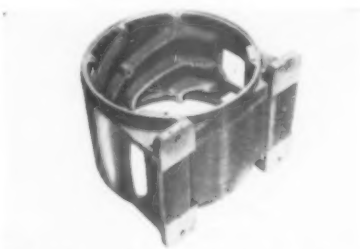
Begins on page 86

For more about these items, circle item numbers on Reader Service Card next to back cover.

169—Skid Lift Truck, weighing about 245 lb., is 40% lighter than most models. Has 5-in. under-clearance in raised position to avoid "hanging" over bump or on ramp when loaded. Deck moves up and down almost vertically so as to drop load close to wall. *Colson Corp.*

170—Pressure-Reducing Regulator provides accurate control of steam pressures for heating, process supply, general plant use. Features fast response to pressure changes, large capacity, and tight shutoff. Sizes: ¾ to 4 in.; pressure: 2 to 150 psi. *Worthington Corp.*

171—Mobile Air Compressor, for paint spraying, cleaning, air-tool operation, etc., moves around on 10-in. tires guided by tubular cart-type handle. Five sizes from ¾- to 1½-hp., electric or gas-driven. Pressure ratings to 100 psi. Constant speed control. *Emglo Products Corp.*



172—Motor has baffles built into frame for ventilation. Drip-proof enclosure protects against particles or dripping. Air moves through spiral ducts, open on both ends, to provide two independent streams. Nema frame sizes 364 U to 445 R. *Fairbanks, Morse & Co.*

Square D TOTALLY ENCLOSED Duct*

takes less space—*and costs no more*

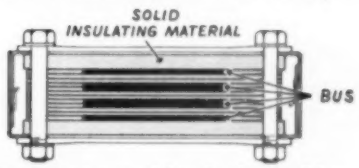
*(low impedance)

Ventilated bus duct is bulky and awkward. It's difficult—sometimes impossible—to install it in restricted areas. The layers of insulation around the bus bars and the necessary air spaces contribute to large, inconvenient size.

Square D totally enclosed feed-in duct solves the space problem. Solid sheets of insulation permit mounting bus bars only ¼" apart. This solid insulating material is also an effective heat conductor, thus eliminating the need for air spaces. The result—Square D low-impedance duct is as much as 50% smaller than ordinary duct. It can be used where no other duct fits. It makes expansion of existing electrical systems easier, new construction planning simpler. Best of all, Square D low-impedance bus duct is totally enclosed. Having no ventilation holes, it's safe from physical damage and dust accumulation. Needing no ventilation, it can be mounted in any position without de-rating.

Doesn't it make sense, when buying feed-in duct, to specify a product that will meet all your requirements? Square D totally enclosed low-impedance duct costs no more—why settle for less?

Here's Why Square D's EXCLUSIVE Design makes ventilation unnecessary



The entire space within the duct and between the bus bars is filled with a solid insulating material which conducts the heat to the surface. There are no dead air spaces inside the duct. Square D totally enclosed low-impedance duct is listed with Underwriters' Laboratories and meets U/L requirements for temperature rise in any mounting position.

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT... NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

For more facts Circle 515 on Reader Service Card

FACTORY

IDEAS OF THE MONTH

By LEWIS K. URQUHART, Consulting Editor

(For more information, circle item numbers on Reader Service Card next to back cover)

Methods improvement fans will want to know about modular work stations (*Products for Industry*) that can be quickly assembled into "custom-tailored" layouts—as quickly taken down and reassembled for next job. **(291)**

If you ship delicate parts, those new V-Dot Indicators (*Inertia Switch*) will show whether rough or careless handling has caused shock exceeding predetermined permissible limit. **(292)**

Add Fire-Spy to growing list of low-cost fire alarms. This one (*Ullman Devices*) sounds off at 135 to 145 F. Plugs into any 110-volt outlet. **(293)**

Stubborn drum bungs give up in a hurry when attacked with a new wrench (*Morse*). Seven projections and five slots insure tight fit over 95% of all popular bungs. Alloy steel or non-sparking bronze. **(294)**

Benchwork stool (*Krueger*) has adjustable backrest, telescopic legs. Seat can be raised up to 9 in. in 1-in. increments. **(295)**

High up on any list of floor cleaners stand two new battery-powered scrubber-vacuum combination machines (*Finnell*) that leave damp-dry paths 20 and 24 in. wide, respectively. Either will clean up to 21,600 sq. ft. per operational hour. Battery charger included as standard equipment. **(296)**

Lowest-priced electric typewriter on the market is claim made for new Electra 12 (*Smith-Corona Marchant*). Full-size keyboard, of course, and just about every standard feature found on deluxe machines. **(297)**

Attention, boat and car owners—as well as those who buy, specify, or work with storage batteries! Fact-packed booklet (*Exide*) tells all, especially how to get the most out of 'em. Free, naturally. **(298)**

Wherever loud noises drive people to drink, that's the place for Quiet-Ear (*Bausch & Lomb*), newest, neatest ear protector of this year 1959. Comfortable, too. No bulky absorbing materials. No big sealing shells. **(299)**

What makes Flexiprenes (*Hood Rubber*) stand out among neoprene-coated gloves is their unusual flexibility and comfort. They're so flexible you can pick up a pin or thread a needle while wearing them. **(300)**

And 5-star rating for another glove (*Keller*). It's a truly reversible safety mitt with extra thumb tucked in across knuckles. Thumb pulls out for use with reverse side of mitt when original surface wears out. **(301)**

For your safety department. Porto-Power hydraulic rescue equipment (*Mine Safety Appliances*). Converts pounds of manual effort into tons of power (up to 20 tons) for lifting, pulling, pushing, spreading. **(302)**

Original copy for these two pages was written with new kind of lead pencil (*Venus*), our nomination for use in *your* office. Black as a soft pencil. Strong as a hard pencil. Makes as many carbons as a ball pen. The Venus 3500 reproduces clearly on office duplicating machines. **(303)**

Neoprene cable will stretch 200% or more and return 150,000 times, says maker (*Stretch-Wire*). For any application up to 75 watts. **(304)**

Snap-lock assembly is what sells us on new extruded aluminum grating (*Read Standard*). No welding. No power tools needed. Just a clip to hammer into place. Swell for catwalks, walkways, scaffolding, balconies. **(305)**

Now direct-positive paper (*Photostat Corp.*) that cuts reproduction time and cost by eliminating extra step of making negatives. **(306)**

Looking for something different in posters for your bulletin boards? Cast your jaundiced eye over a new series (*Publication Counseling Service*). They talk employees' language, carry good-humored messages. **(307)**

They sure do glow, those Day-Glo fluorescent safety paints (*Switzer*). Said to be four times brighter than usual safety colors. Which sounds to us (after being dazzled by five colors) like the understatement of the month. Acrylic lacquer for fast-drying, alkyd enamel for brush or spray. **(308)**

Speaking of safety paints, there's Cat-Grip (*Solfo*), a non-skid compound you can add to any paint, lacquer, enamel, or varnish without changing color. Good, it would seem, for scaffolds, stair treads, cement floors. **(309)**

For electronic trainees there's a new circuit board (*Plastic Associates*) that permits rapid assembly or disassembly of electrical circuits without solder, clips, screw connections, etc. **(310)**

Were we a welder, working with argon, helium, etc., we'd want to play safe by wearing soft grain leather protective clothing (*American Optical*). Short jacket, 26-in. jacket, cape sleeve, or cape sleeve and bib. Light and flexible. Sleeve and bib, for example, weigh only 15½ oz. **(311)**

More Ideas of the Month in Press Time Report following page 52

REPUBLIC MATERIALS HANDLING EQUIPMENT... saves time at Signode Steel Strapping

680 Republic Stacking Boxes in use and more on order!

The Signode Steel Strapping Company, Glenview, Illinois, makes good use of these rugged boxes in the production of stretchers, sealers, cutters, power strapping machines, and seals. Signode, largest producer of such equipment in the U.S., knows that Republic Stacking Boxes speed materials handling while greatly reducing storage area requirements.

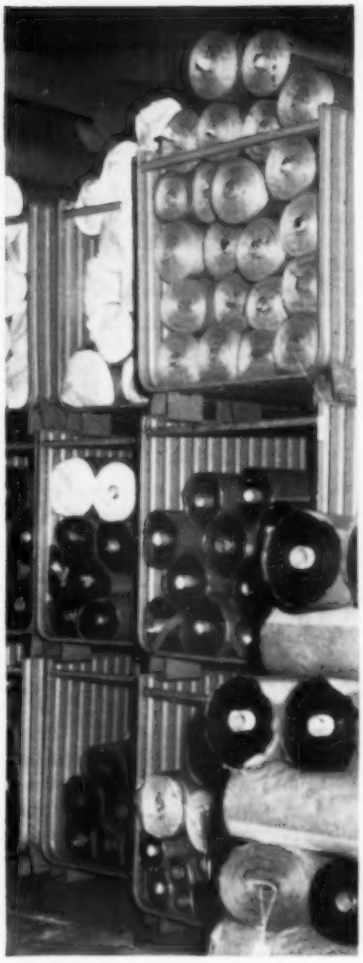
At Signode, boxes are filled with finished parts and stacked high awaiting production assembly or shipment. Stacking does not damage the boxes. Heavy-duty stacking brackets and corrugated box construction deliver long, efficient service at low per-year cost. In addition, four-way fork channels simplify handling in restricted space. Smooth flange around the top eliminates sharp edges.

Let the materials handling engineers of Republic's Berger Division work with you in solving your materials handling problems. Like Signode Steel Strapping, you'll find there are many new ways to save time, money, and storage space in your plant. Call your Republic representative or write direct.

For more facts Circle Reader Service Card numbers as follows:

REPUBLIC STEEL LOCKERS offer clean, attractive, dress-wash-change facilities. Interiors are spacious, well designed for convenience and ventilation. Bonderized to resist rust, retard corrosion, and provide better paint adhesion. Finish is baked enamel. Positive locking and heavy-duty steel construction assure protection of personal effects and tools. Made of steel, strong and sturdy. Attractive design. Mail coupon for data, prices, and delivery.

REPUBLIC METAL LUMBER® meets in-plant framing needs quickly, easily, and economically. Unique pattern of short slots allows complete flexibility and assures sufficient bolts in bearing to give adequate joint strength. Bonderized and finished in baked enamel after fabrication. Convenient bundles of 10 pieces, 10- and 12-foot lengths, bolts included. Simply plan, cut, and bolt to get the job done the new METAL LUMBER way. Send for complete details.



MATERIALS HANDLING EQUIPMENT FOR THE TEXTILE INDUSTRY reduces the problem of handling, transporting, and storing bolts of cloth. Open-end construction permits easy access to bolts. Offset channels under each unit permit tiering to any practical height, save space. Rugged, corrugated construction assures long, efficient life at lowest per-year cost. And, four-way fork channels simplify handling. Mail coupon for additional information.

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Please send more information on:
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HUMAN RELATIONS

By GEORGE A. HOY, JR., Industrial Management Editor, FACTORY

Craftsmen Grow Up

It's not uncommon for apprentice graduates to turn in their tools for a briefcase. A study conducted by the Bureau of Apprenticeship and Training, U.S. Department of Labor, showed that more than one-fourth of all apprentice graduates advance beyond the journeyman level in six years.

The study covered 3278 former apprentices who achieved their journeyman status in 1950. Complete details of the study are reported in "Career Patterns of Former Apprentices" (Bulletin No. T-147, available from the Bureau, Washington 25, D.C.).

Another interesting fact revealed by the study:

Six years after completion, 93% of all former apprentices were still doing work related to their trade. The one-fourth who had advanced were mostly in better jobs directly related to their trade.

Scarce Social Scientists

"At the New York headquarters of giant AT&T," reports Peter B. Bart of *The Wall Street Journal*, "there are over 30 social scientists working on various projects. Another 40 work at the company's Bell Laboratories.

"Scan a directory of General Electric Company and you'll find one official in charge of human behavior research, one heading sociology research, another specializing in public issues research . . .

"A number of sizable companies, such as General Foods, Eastman Kodak, and Dow Chemical, also are backing research projects through the Foundation for Research in Human Behavior in Ann Arbor, Mich. . . ."

Reporter Bart's article points up the growing role of the social scientist in industry. He concludes that the biggest problem today in this burgeoning field is the scarcity of qualified men to meet the demand.

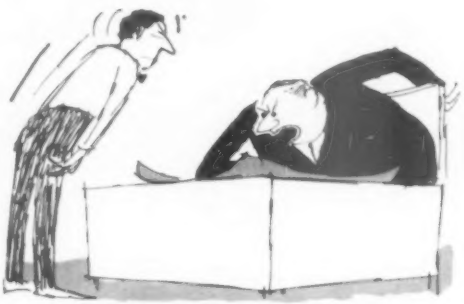
Bart quotes a top research official of one big concern as follows: "You can't hire a man who has just taken a few sociology courses in college—he'll just get completely lost. On the other hand, if you hire a brilliant professor, chances are you won't be able to understand what he tells you."

Manager Monkeys Get Sick

Ulcers and artery disease—that's what happened to monkeys when they were made into managers and executives at the University of California Medical School, Los Angeles.

To approximate the life of the modern manager, Dr. Robert W. Porter put the hairy heroes through experiments that demanded they constantly make decisions to avoid electric shocks. The animals were under constant stress. They got ulcers in a few weeks. Hardening of the arteries might have been another result.

Moral: Relax. Tension will make a (manager) monkey of you.



How to Kill Ideas

Sour-faced managers—like the one in the cartoon—are creativity crucifiers, says the *Acme Reporter* (Association of Consulting Management Engineers, Inc., New York).

What doesn't kill creativity? Clearly defined policies don't.

Apparently some managers steer clear of formal policies on products (and methods). They're loath to draw too small a box around the creative employee's imagination. They fear it will kill his idea urge. Says Acme: "Employees with ideas prefer some guidelines. Then they know that final decisions will be made according to an impartial yardstick, not by snap judgment."

Oops—Home for a Week

It's big news for the newspapers when a daredevil acrobat falls down the basement stairs and winds up in the hospital. It's bad news for your plant when employees do the same thing.

Chances are, you have more absences as a result of off-the-job injuries than from those incurred on the job. The statistics show 5 to 20 times more accidents, says Harry C. Johnson, a staff representative of the National Safety Council's off-the-job accident safety committee.

Study of 84 companies employing a total of 348,000 employees shows auto-truck accidents and slips and falls in close competition. The prize: the dubious distinction of grand champion off-the-job injury dealer. No question about it, auto and truck accidents killed the most people who would otherwise still be at their desks or machines. But among all but the largest four of the companies studied, slips and falls were the most frequent cause of injury incurred away from work.

Meeting With the Stockholders

From New Jersey to California, 16 simultaneous meetings got under way with identical words. And the supervisors in the meetings got first-hand experience to help them understand the importance of a much-talked-about-but-seldom-seen factor in modern corporate life—the company stockholders. They also got the latest word on company plans.

Occasion: annual meeting of stockholders of Worthington Corporation (Harrison, N.J.). Words: two speeches by the company's chairman and president, outlining future plans. Means of transmission to the 16 locations: closed-circuit telephone lines leased from New Jersey Bell Telephone Company. Effect: updated supervisors with a better understanding of the company's owners.

More Money Freedom

A good salary administration program has four strong elements, according to Richard B. Blomfield, manager of salary administration for Union Carbide Corporation. Here are the four elements:

1. It adequately and fairly compensates the personnel in the organization.
2. It encourages people to grow and develop.
3. It is competitive in the marketplace.
4. It provides freedom of action for managers to administer salaries at their levels.

The last point reflects the modern trend toward minimum control in salary administration, Blomfield told the American Institute of Chemical Engineers. Salaries administered by line managers become an important factor in running their departments. Salary increases become a constructive instrument in employee relations. Employee morale is improved. He concluded: "Fixing as much of the responsibility as possible with the individual supervisor tends to eliminate 'passing the buck.' "

Too Big? Too Strong?

Managers and businessmen aren't the only ones to stand in awe of the power of modern unions. According to a survey of several thousand wage-earner families, workers, too, are goggle-eyed at union power.

Here are some results of the survey:

• Question: Should the power of unions be limited by law? Yes, say 70% of wage earners surveyed. Yes, say 62% of union members in the group.

• Question: Do you think some of the big national unions are becoming too powerful? Yes, say 65% of wage earners. Yes, say 58% of union members.

The survey was conducted by *The Wage Earner Forum*, which is sponsored by Macfadden Publications, Inc. Questions are mailed to homes where the chief income producer is a wage earner—skilled, semi-skilled, or unskilled.

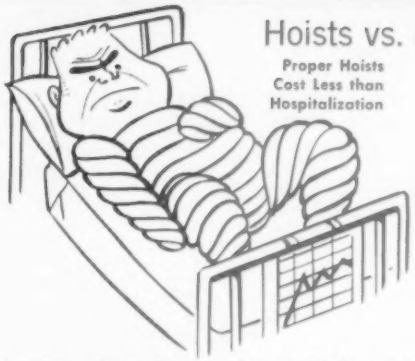
Friends—and Proud of It

"Don't worry about us!" says the opening line of a letter sent to all customers of Norma-Hoffman Bearing Corporation (Stamford, Conn.). The letter explains that workers and management have agreed on a new two-year contract. It sums up:

". . . You can depend on all of us at Norma, where working together is considered the best way of living together with you, our valued customer." The letter was signed by the vice president of manufacturing and the president of the local union.

A good customer relations move? You bet. And, in addition, it helped workers understand the customer's point of view.

Tuffy Tips —on safe use of Slings and Hoist Lines



Proper Hoists Cost Less than Hospitalization

Hoists vs. Hernia

A manufacturer said recently that 75% of his compensation claims were connected with hernia—a common hazard in heavy lifting. About the same time, we heard from the Ohio Bureau of Workmen's Compensation that the average hernia claim (circa 1957) was $750. No need to stress the need for hoists instead of muscle for lifting tasks. Said "Occupational Hazards" magazine: (Hoists) with proper attention, given slings and periodic inspections, will help substantially in reducing back injuries and hernia claims by reducing the strain on workers."

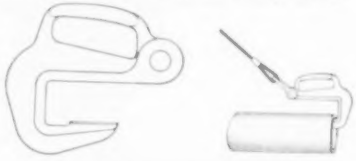
A Few Rules for Safe Use of Hoists and Slings

1. Use a proper size hoist—not human backs and muscles—for every heavy lifting job.
2. Never use load chains as slings. Chain links break easily after distortion.
3. Use the sling that's right for the job. There's a Tuffy Sling for every purpose.
4. When loading slings with more than 2 legs: load a 3-legged sling as though it had 2½ legs; load a 4-legged sling as though it had 3 legs.

Proper Fittings Give Slings Added Safety and Service Life

Union offers a sling fitting for every need. We recommend having them factory-fitted when you order your slings, but they can also be fitted in your own rigging loft. Shown here are two of a score of different fittings used on Tuffy Slings.

NEWCO STANDARD CHOKER HOOK: Standard in design, but extra high in quality and safety. Castings are always smooth and clean. No cutting or chafing slings. This hook can be attached to the end of sling instead of the main body, thus allowing the main part of the sling to be free of fittings.



NEWCO PIPE HOOK: Precisely "tailored" to the job of moving and laying pipe. High strength steel. Capacity of 3500 lbs. Pad at end allows threaded pipe to be handled without damage to threads. Eye opening is large enough to accommodate a shackle or thimble. Hook has a lifting handle for easy moving.

Made for Each Other: Tuffy Slings and Hoist Lines

Tuffy Slings and Hoist Lines make a top-performing team for every kind of hoisting work. Tuffy Slings are made of a patented, 9-part machine-braided wire fabric that's extra flexible, and isn't materially damaged by knotting or kinking. Tuffy Hoist Line is a special rope construction for use on all types of overhead cranes, derricks and clamshells—and wherever else an extra-quality, extra safe hoist line is needed. Reports from the field tell of Tuffy Hoist Lines running two and three times as long as ropes previously used.

Tuffy Kink-Resistance is Unmatched

Kinking is one of the worst hazards of wire rope and sling use. With ordinary wire rope slings, an acute kink results in serious damage and weakening that makes the rope unsafe for further use. With Tuffy, it's a different story. The super-flexible fabric is just about impossible to kink. If it does under exceptional conditions, the kink can be easily straightened out with no harm done.

Safest Ferrule Ever Made

The pressed-on steel ferrule is applied under great pressure. The ferrule metal virtually flows into voids between wires and strands of the fabric. Result: an eye splice with 100% of fabric strength, and a ferrule so smoothly tapered to the sling body that there are no abrupt edges or rough projections to snag or injure hands. And the extra service life, efficiency and safety of Tuffy's pressed-on ferrule are yours at no extra cost.

FREE! New Tuffy Sling Handbook

Revised and enlarged edition. Covers all the bases in selection and use of Tuffy Slings and fittings. Gives types, dimensions and rated loads. Includes safety-approved hand and whistle signals in operation of various equipment. Send for your copy now. **Write Union Wire Rope Corporation, 2234 Manchester Ave., Kansas City 26, Mo.**

Specialists in high-carbon wire, rope, braided wire fabric and stress relieved wire and strand.

Your Tuffy Distributor is Ready to Help You with any Sling or Wire Rope Problem

UNION Wire Rope

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FACTORY

PLANT OPERATING MANAGEMENT

CASE BOOK

WARREN J. KING
Manager, Features and Departments

"SPIDER LEGS" FRAME FORMER FOUNDRY NOW CONVERTED TO BIG METALWORKING AREA . . . PAGE 125

HIGHLIGHTS: Make your enemies friends (p. 124) . . . this borer does tricks (p. 125) . . . drillpresses ride on own "monorail" track (p. 126) . . . blows up fast (p. 128) . . . missile parts get a quick check (p. 129) . . . seals out the cold (p. 130) . . . expensive material cuts costs (p. 131) . . . maintenance by television (p. 135)

FACTORY CASE BOOK

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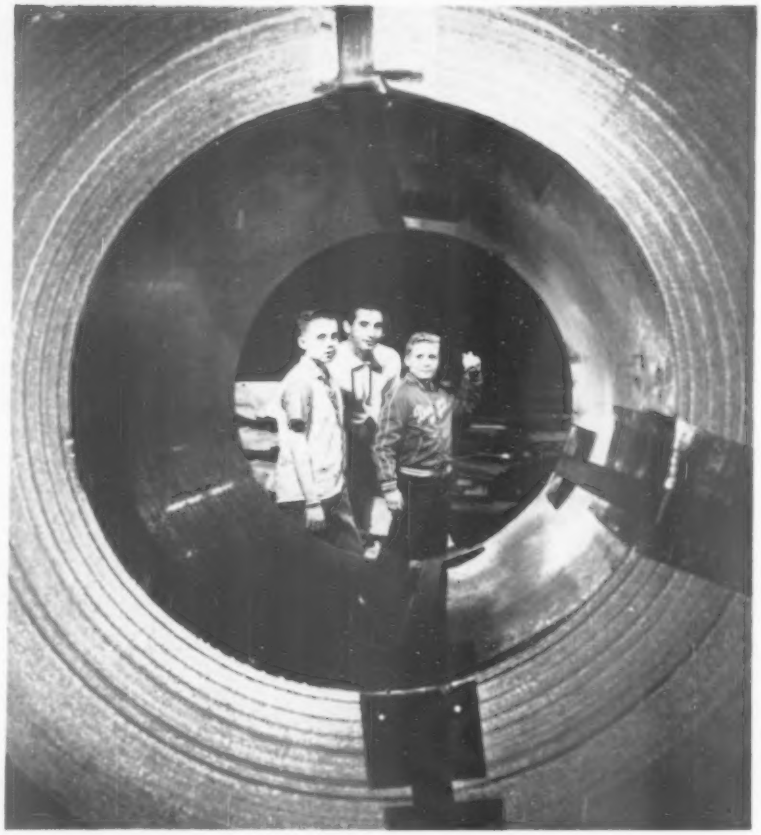


How to Make Friends of Enemies

The two boys in the above picture are getting pitching instruction from a real Big League pitcher. It happened at the opening of last year's baseball season, when 75 YMCA boys and their dads assembled at Rolled Steel Corporation (Skokie, Ill.) to meet the visiting Los Angeles Dodgers. This baseball open house was the first in a series. But it's only one part of an active community relations program sponsored by Rolled Steel. The purpose: to turn antagonistic local residents into friends of the company.

Antagonism arose when the company announced plans to build a plant in Skokie on a site adjacent to Chicago city lines. The area was zoned for heavy industry, but nearby residents filed suit asking the Village of Skokie to revoke authorization for the proposed plant. The suit alleged that Skokie was violating its own ordinance, which required a 20-ft. strip between industrial and residential areas.

After demonstrating its intent to operate a clean and quiet plant, Rolled Steel prevailed on the neighbors to drop their suit. And so far the company has fulfilled its promise not to inflict industrial noise, smoke, and odors on the community. To do this Rolled Steel took the following special steps at the site of the new plant:

- Bought additional land costing $25,000 and moved the already-started foundation 10 feet. This provided a 30-ft. buffer strip between the plant and its boundary.
- Razed unsightly buildings at site before starting construction.
- Abandoned the use of railroad tracks near neighboring homes and laid 2700 feet of new track.
- Resituated the plant so no driveways would enter or exit on residential streets. The parking area was also built to keep neighboring streets free of traffic.
- Incorporated an attractive design, using blue glazed brick exterior.
- Advertised in Skokie newspaper to inform residents of steps taken in

their interest. On completion of plant, Rolled Steel invited its neighbors to open house and tour.

The company didn't stop its community relations program when the problem seemed solved. Today it sponsors a Junior Achievement group. It lends its selling room to the Community Fund for telephone solicitation of pledges. It aids the YMCA, hospital, school for retarded children, and other charities with both financial and volunteer help.

Results: The company that started life in a community with a suit was awarded the Industrial Good Neighbor citation by the Association of Commerce and Industry. And the company president was named Man of the Year by the local chamber of commerce. The baseball open houses are the latest community relations idea the company is trying out. So far, it's a roaring success.

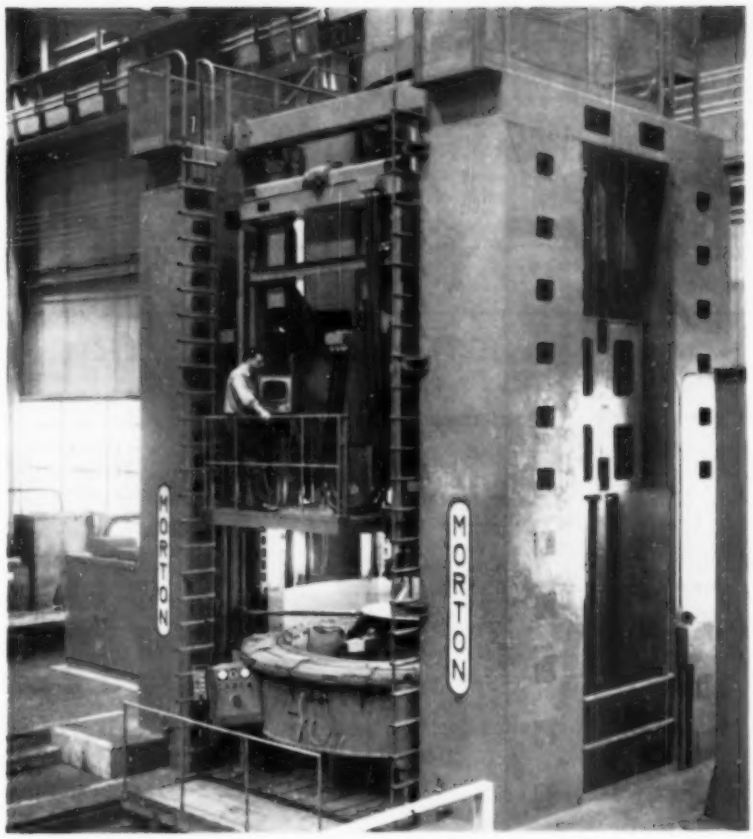
Foundry Gives Way to Manufacturing

(Cover Story)

This view you get through the "spider's legs" at the end of a heavy metal cylinder shows the newly converted metalworking area at Baker Perkins' Chemical Machinery Division in Saginaw, Mich. Most of the floor space you see is now devoted to manufacturing special mixers and centrifugal-type machines for the chemical, plastics, rubber, petroleum, and food industries.

The heavy saucerlike pieces shown through the spokes are steel-dished heads used in fabricating high-pressure vessels. The work area is a portion of the space formerly occupied by the firm's 44-year-old foundry. This operation was discontinued last fall to provide more floor space for manufacturing to meet increased production needs.

Contributions from readers reporting experiences will be welcomed. No need for fancy writing; just a clear, concise statement of facts. If you have photos or drawings, be sure to include. We'll edit for the Case Book. Contributions accepted will be paid for at time of publication. Address: Case Book Editor, FACTORY, 330 West 42nd St., New York 36.



Vertical Borer Does New Tricks

As a result of innovations, the machine shown above can turn out more accurate work three to four times as fast as older, conventional machines. An elevator, closed-circuit television, numerical controls, and visual indicators all help the operator precisely control operations of this huge vertical boring machine. It has just been installed in General Electric Company's Large Steam Turbine-Generator Department at Schenectady, N.Y.

The giant borer can handle 20-ton turbine shells up to 8 feet in diameter and 8 feet high on its stationary worktable while any of four rotating boring heads cut away the metal.

The 43-ft.-high machine has an elevator of its own. This moves up and down so the operator can service the machine at any level. Controls are centered on the bridge. A numerical positioning system controls vertical and radial tool movement for inside and outside boring. A visual indicator uses a full-size template and quill to trace the tool position along a cross-section of the workpiece. And at the same time, closed-circuit TV transmits a picture of the cutting action from a camera on the boring head to a receiver on the bridge.

The worktable moves out from under the column and bridge for loading and unloading. Raw castings are accurately located on the table by a series of circular grooves machined in the table, then are securely clamped in place. When the table returns to the machining position, it's locked in place by heavy positive stops to insure accurate location of the work. A clearance hole through the table and column foundation allows chips to fall to an automatic removal conveyor.

The four boring heads can cut from 16- to 60-in.-diameter surfaces. Carboloy disposable cutting inserts with a tool life of 20 to 30 minutes are used. The visual template indicator is particularly useful in machining around contours that the

operator is unable to see directly. It also reduces operator checking of the work face.

The 575,000-lb. machine rests on a foundation of 24 large piles driven 125 feet to rock. The Morton Manufacturing Company, Muskegon Heights, Mich., built the borer at a cost of over $1-million. It is powered by 19 motors ranging from ½ to 100 hp. G-E supplied all the motors, controls, TV circuit, and electrical equipment.

Tiny Fire Truck Goes Anywhere

This tiny fire-fighting truck packs a big punch at Bell Aircraft Corporation's Niagara Frontier Division plant (Buffalo, N.Y.). Although the truck is small enough to get on any freight elevator for floor-to-floor travel, it can still carry sufficient equipment for effective, emergency fire fighting.

The truck weighs only 3190 pounds, carries a 75-gal. water tank with 50 feet of fire hose. In addition, it packs 100 pounds of carbon dioxide (with its own line and nozzle), two dry chemical extinguishers, a Scott Air-Pak, boots, coats, gloves, helmets, a fire axe, lifelines, hand lights, and other necessary clothing and equipment.

Nitrogen pressures the water, thus eliminates need for a bulky water pump. All a fireman does is turn just one valve on the nitrogen gas cylinder. This exerts 225 psi. of pressure on the water.

Truck is only 9 feet long, 3½ feet wide, and 5 feet, 8 inches tall. Its small size and easy handling make it possible for Bell firefighters to drive the truck to any plant location for preventive stand-by duty or emergency fire.

No-Squawk Parking

The machinist drove his car to his usual parking place on Orange Street. But things had changed since the day before. A parking meter had been installed.

Did the machinist get upset? Drive frantically around looking for another spot? Or plug a dime in the slot, planning to run out every two hours with another? He did not. He sighed, thought of the good old days before parking meters, and drove into the plant parking lot.

The machinist took the change so calmly because he had been informed of its coming. The company newspaper at The F. E. Myers and Brothers Company (Ashland, Ohio) had announced the impending meter installation. The paper had also told the machinist of a survey of the parking lot to prove there were enough spaces for his car and those of all other employees.

In addition, the article told the reason for the meters. The company had encouraged the city to install them so salesmen calling on Myers could park closer to the plant offices. They had been forced to park so far away that many had to make two trips to get their sample cases into the office.

This is a lesson in good communications. It's a small issue, but it shows respect for the worker and the community. Most companies would have let the machinist shift for himself the day he found the meter at his regular parking place. And most companies would have let the city take full blame for installing the meters.

Presses Ride Rails

Riding just like a monorail, these two drillpresses make short work of drilling and tapping long strips at Kidde Textile Machinery Corporation in Bloomfield, N. J. Kidde built the special 18-ft. table with a cantilever-supported railing on which the presses ride.

Work is held in jigs for drilling, in clamps for tapping. Operator drills a row of holes with one press, taps them with the other. A multiple head attachment makes it possible to drill up to 450 holes per hour—five at once if the hole diameter is less than ¼ inch.

The tapping machine is rated at 400 holes per hour. The overhead Walker-Turner drillpresses have a 20-in. drilling head, a 33-in. column with raising mechanism, and an overhead ballbearing carriage. The supporting rail is of welded construction, specially machined to fit the drillpress carriages.

It's Cool Inside

A ticklish heat problem in the close quarters of new mobile radar vans has been solved by low-velocity air diffusion panels. The units serve a dual purpose, according to engineers at Hughes Aircraft Company, Fullerton, Calif. First, they keep the myriad units of electronic equipment at proper operating temperatures. Second, they maintain comfortable working conditions for the seven men working inside the compact vehicles.

The air diffusers consist of panels with perforated distribution plate (The Pyle-National Company, Chicago). These, with the help of a pressure displacement valve, slow the speed of cool air and diffuse it evenly throughout the area. Air travels from the cooling source to the panels through the plenum above the van ceiling. Standard high-velocity air diffusion was unsatisfactory from the standpoint of both noise and draft.

Displaced Guards Get Other—and Better—Jobs

Last fall Standard Pressed Steel Company (SPS), Jenkintown, Pa., decided it could save $25,000 per year by contracting its plant security to Pinkerton's National Detective Agency. Biggest problem in the change was how to break the news to the present guard force of 16 SPS veteran employees.

STEPS PLANNED

But SPS was able to accomplish the changeover with a minimum of upset to all concerned. How? By following the cautious 10-point plan outlined below:

1. The 16 guards (their captain included) were called in as a group by management and told the news before anybody else heard it.

2. Guards were told they were valuable to the company, would get new assignments, would be as well off as before—or better.

3. Each guard was interviewed individually, but not at random. First came the captain (management knew he was popular with the men—they would trust his report of the interview). Next called were two other popular guards (they were men known to be reasonable). Then the company waited for a few days for the captain and the other two men to spread the word. Result: The rest of the guards came into their interviews with a good attitude.

4. In the individual consultation, SPS first asked the men what they thought they would want to do, based on their knowledge of production, maintenance, and clerical activities in the plant.

5. Basic criteria in assignments (and inducements), stated in advance to each man, included these:
- A spot where he would be able to make more money.
- The shift he wanted. Some benefited by shucking an undesired second, third, or split shift.
- A job that would not be tough or unpleasant.
- No weekend work.
- A choice, where possible, of two or three different spots.

6. Existing arrangements, if they did not interfere with the new assignment, were continued. For example, a second-shift guard who had made pocket-change selling papers was given another second-shift job–in maintenance.

7. Each man got a tentative assignment to an open job that he would like and could handle. Then he was again interviewed, was urged to try his new assignment for a week or two. Every man did.

8. New supervisors were advised to welcome the new man and to make sure he got the right training.

9. The man's old supervisor and personnel department people stopped by occasionally to wish him well on his new job.

10. Two requested reassignments were made willingly shortly after the switch. One old-timer had insisted on an odd-chores job in the maintenance department, but within two weeks he asked for reassignment because he was bored. Another man had asked for and was given a job at a machine, but found he was a little awed by it all. He was moved to a job he was better fitted for.

CHANGEOVER MADE

The changeover from home force to Pinkerton's was smooth. It was made one Monday the end of November, just a few months after it was first considered. All 16 of the former force started work that day on new jobs. None was paid less than before. Several were paid more.

About 25% of the men wound up in production jobs—on Kingsbury multiple-station drilling presses and other second-operation finishing machines. Another 25% moved into maintenance and other service jobs, such as tool control. About 50% went into quality control and inspection—some of which was incentive machine work. Some typical cases:
- The captain, originally hired (at age 50) in 1942 as a machine operator, had been switched to guard work after the war. Since he had paperwork experience, he was put into maintenance scheduling.
- One guard, hired in 1942, was moved into quality control—has since become one of SPS's best bench inspectors—and is making 20% more in hourly wages.
- Another former guard, with lots of drive, switched to a cycle operation (controlled by machine) where he does incentive inspection work on a three-man team. He's up nearly 30% in hourly wages.

SPS headquarters plant in Jenkintown is a sprawling operation: main plant, plus a large pressed-steel shop, and outlying buildings (including a warehouse 8 miles away and a manufacturing subsidiary some 5 miles distant). All are integrated into the security system.

About 3000 people were working in the 850,000 square feet of buildings and 44 acres of grounds when SPS took stock of its plant protection and security operations.

Age of guards ranged from 55 to 63. Most had not been hired for the job, but had gravitated there for various reasons. Six were due for retirement within two years.

GAINS ADDED UP

The company called in Pinkerton's for a survey and estimate, found it could have an outside security force and save an estimated $25,000 a year. Per guard man-hour the outside service costs SPS about 30% less. The savings result mainly from elimination of fringe benefits formerly paid guards, as well as of the uniforms, revolvers, and other equipment formerly provided.

Here are six other advantages:

1. Training and supervision by professionals, not by plant personnel harried by other duties. But the outside security officer takes orders from SPS, reports each day.

2. Better enforcement of security. A plant guard may not report troublemakers he's friendly with.

3. Fewer incidents, complaints. Before, even minor incidents were employee-vs.-employee situations that took personnel time to referee.

4. Immediate remedy for misfits. For the inevitable personality clash, there's now instant remedy. Pinkerton's replaces the man.

5. Ability to qualify for classified work. SPS does some work on atomics and missiles. Pinkerton's can quickly produce government-cleared guards for such contracts.

6. An end to the problem of handling guard schedules, vacations, overtime work, and so forth—a problem made complex by the need for staff security around the clock, on Saturdays, Sundays, and holidays.

KEEPS CLOSE TABS ON LIQUID INVENTORY

These sliding indicators show the approximate liquid level in each tank at the Glycol Plant of Dow Chemical Company, Midland, Mich. Tanks and other storage facilities, reasoned Glycol Plant Superintendent Ellery Gilson, could be watched best by building an inventory board that offered graphic representation of the level of liquid in each. The board (photo) is made of Styron sheet. Red sliding indicators for each tank are moved up and down by hand while friction holds them at any level. Another similar board using instrument dials and pointers helps the power department indicate present and previous levels of oil in storage.

Sit Up Straight, Produce More

Those are office secretarial chairs on the production line in the photo above. They've upped production 30% at Sevigny's Candy, Inc. (West Hanover, Mass.).

The company noticed absenteeism among packers was climbing while productivity was falling off. Then an office equipment salesman suggested posture chairs for packers. Within four weeks the absenteeism problem had disappeared, production had jumped as much as 30%. Each packer has her name label on the chair that fits her best.

Decisions "Sold"

You make two different kinds of decisions in your plant. Some are "quality" decisions. Others are "acceptance" decisions.

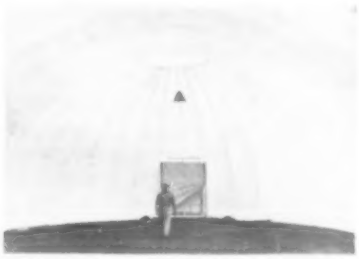
Quality decisions have to be right. For example, the decision to install a new automated assembly machine is a quality decision. It's a major investment. You base the decision on cost studies. You can't afford to be wrong.

Acceptance decisions depend on the attitude of others for their success. For example, take the plant with a trackless-train material handling system. Periodically a new unit replaces one of the 10 tractors in the fleet. Each time, there's a question on who should get the new tractor. Should it go to the man whose truck is being replaced? Should it go to the senior man? Or should it go to the man with the longest route? Any of these solutions is satisfactory to management. The problem is, none of them is going to satisfy all drivers. They're human.

When quality decisions come up, you'll want to make them yourself, with the aid of any experts you need. But when acceptance decisions are in order, group discussions and decisions are better than an edict from the boss. So says Professor Norman R. F. Maier, University of Michigan psychologist and pioneer in group decision-making. As a guide he gives a list of eight acceptance problems best solved by the people directly involved rather than by you, the boss.

Here are the eight problems:

- Fair distribution of something desirable, such as a truck, new tools, new foreman's desk, office space or machine.
- Getting unpleasant things done. For example, boring work, overtime when nobody wants it, unusually dirty jobs, or jobs separated from the regular work group.
- Scheduling vacations, coffee breaks, lunch hours and overtime (where the overtime system isn't spelled out in the contract).
- Disciplinary problems involving lack of cooperation or violation of safety rules.
- Setting standards on tardiness and absenteeism.
- Establishing goals for production, quality, and service.
- Improving safety conditions and housekeeping.
- Changing work procedures, standards, and equipment where change will make the job easier.



"Airgloo" Inflates in Five Minutes

This self-supporting storage building is big enough to hold 900 oil drums. It has no visible means of support, no columns or structural members to get in the way. It's Esso Standard Oil Company's new outdoor storage shelter at the Bayonne (N.J.) refinery. Takes only 3 psi. of air pres-

sure to keep the 3000-sq.-ft.-building inflated.

Made of fire-resistant synthetic fiber coated with plastic, the 40x80-ft. building withstands up to 75-mph. winds. Entrance is through flap doors at either end. These open easily at the touch of a fork-lift truck. Once truck is inside, doors close automatically.

Although it takes only five minutes for the building to inflate, it takes a full hour for it to deflate if something goes wrong with its low-pressure blower. Esso personnel dubbed the structure "the airgloo" because it looks like an igloo.

BOOST FOR TRUCK SPEEDS UNLOADING

This trailer getting the heave-ho is dumping wood chips into a storage bin at Certain-Teed Products Corporation, Savannah, Ga. It's part of an integrated storage and handling system (Link-Belt Company, Chicago) used in the conversion of chips to asphalt roofing. To unload chips, truck backs under 40-ft. hoist tower. After rear wheels are blocked and trailer is disengaged, a 15-ton-capacity hoist hooks onto a sling coupled to front of trailer. While lifting, hoist carriage moves horizontally so it remains directly over trailer sling. Hoist is remotely controlled from the base of the tower. After dumping, trailer is lowered, disconnected, and pulled away.

Ultrasonics Speed Parts Machining

Ultrasonic testing of aluminum spar caps makes sure finished thicknesses stay well within the specified tolerance at Republic Aviation Corporation (Farmingdale, N.Y.). During machining, only a small portion of each spar cap is exposed. Thus periodic gaging with calipers and other standard methods meant costly and time-consuming removal of parts from machines.

The Vidigage (Branson Instruments Inc., Stamford, Conn.) makes it possible to measure any part to micrometer accuracy while it is still mounted on milling machines. Access to one surface is all the operator needs. He simply applies the ceramic transducer to the work, instantly notes thickness on direct-reading scale. Added advantage: It doesn't take much training to operate the tester accurately.

Checks Flatness

Near perfection is required by these seals for Thor and Jupiter missile engines. An optical device (photo) measures the degree of flatness to a millionth of an inch. It's used in the machine shop of Rocketdyne, a division of North American Aviation, Inc., Neosho, Mo.

Using quartz lens the inspector gets refracted bands of light from the seal's surface on the mirror. They appear as curved parallel lines. The seal passes inspection if no more than two of these lines intersect a vertical line at the right of the reflection. Rejects are re-ground on a cast-iron lapping wheel wetted down by an oil mixture containing an abrasive slightly rougher than talcum powder.

News on Feeding

Wondering how your plant stacks up in its food service to employees? You'll get some hints from these results of a U.S. Department of Agriculture survey. Although the results have just been released, the survey itself was made back in 1956. Here are some of the survey's main findings:

1. Almost 6000 manufacturing plants with 250 or more employees provide some type of regular, on-premises food-serving facility for plant personnel. This figure represents about half the plants of this size in this country.

2. Large plants (over 1000 employees) are more likely than medium-sized or small ones to have food services. A larger share of factories in the North Central States and

South provide facilities than in the Northeast and West.

3. Nearly three-fourths of food services in plants were installed since 1935. The newer the factory, the more likely that it has some kind of food-serving arrangements.

4. Among plants with food services, seven out of 10 are in the North Central and Northeastern States, the most highly industrialized areas of the nation.

5. Nearly two-thirds of the in-plant facilities are managed by outside caterers. Company personnel operate most of the remainder.

6. Regardless of whether these food services are contract- or company-operated, most are subsidized to some extent. This is done by direct cash payments to make up any difference between cost and income; by not charging for some or all current operating expenses like rent, utilities, and maintenance; or by using a combination of subsidies.

7. Food is available at noontime in all facilities. Also a large share are open for at least one other meal period. A few plants have some type of food service that is available around the clock.

8. Menus, especially in cafeterias, usually provide choices among "plates" at special prices and *à la carte* offerings. Menus from canteens or mobile carts are limited to *à la carte*.

Speeds Missiles

This is the BEST way to speed assembly of electronic missile-guidance and ground-support systems. (BEST stands for Bench Electronics Systems Track.) With this system, Nortronics, a division of Northrop Corporation (Hawthorne, Calif.), eliminates shop clutter of toolboxes, locks, and overhanging air and power outlets. Improves housekeeping, too.

System consists of 24-ft. pressed steel assembly benches seating 12 operators, six on each side. Assemblies ride along edge of bench on four-wheel skates. At desired position the 1½-in. shafts of arms-supporting assembly lock in place on skates. Tools, soldering iron, and spare parts are within arm's reach of each operator on a bench. When it's time for a unit to move from one work station to another, operator swings the assembly into a vertical position above center bench and wheels it along track.

Color adds a final touch to this production layout. Portable tray racks are a brilliant yellow; chairs, black; floor, light blue; walls, cream. Some assemblies pass from one operator to another along a row before completion at final bench. Others move from row to row before final assembly.

Seals Out Cold

Cold and inclement weather holds no terrors for handlers working on this loading dock. Incoming and outgoing trucks make their own weatherproof seal when they back up to dock doors. It's accomplished by framing each doorway with epoxy resin sheets at the Dow Chemical Company, Midland, Mich.

First step in weatherproofing was to reduce door openings in size so they matched a standard truck trailer cross-section. Then flexible epoxy foam was secured to the top and sides of the opening. The seal keeps out wind, dirt, rain, snow, other airborne contaminants. Gives customers a cleaner, higher-quality product, provides workers with more comfortable conditions.

Stainless Steel Paint Stands the Gaff

Here's a new paint that can save industry millions of dollars annually in maintenance paint bills. It contains stainless steel. In tests made by the American Electric Power Service Corporation (New York) over the past eight years, this paint kept its finish with practically no deterioration. It's highly resistant to corrosive atmospheres such as smoke, acids, and chemicals.

When applied with brush or spray, the coating has excellent hiding power. Ultra-smooth surface discourages dust and dirt formation. It withstands heat up to 250 F. The paint blends stainless steel powder and non-metallic pigments in synthetic resin vehicles.

The new paint was first developed by E. J. Higgins, protective coating engineer with American Electric Power. Now Debevoise Company (Brooklyn) and Vita-Var Corporation (Newark, N.J.), collaborators with AEP in the research and development of this paint, have introduced it commercially.

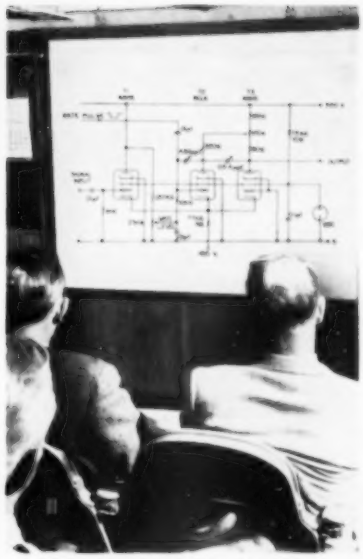
For test purposes one coat of paint was applied to primed and unprimed steel and weathered galvanized angle irons. After two years' exposure in a corrosive atmosphere, results on the primed samples were impressive. More testing was then arranged. This time a finish coat was applied to electrical substation structures and transmission towers. Now, after eight years, the towers look just as good as new.

Stainless steel paint costs over $10 per gallon in 5-gal. containers—more than twice as much as standard structural grey finishes. But substantial savings are expected. AEP believes it will hold up for 12 years or more, double the life of structural finishes that now last only about six years.

New metal surfaces need only a rust-inhibiting primer as base for this paint. It covers old paint (after spot-priming of blistered or scaled-off areas) with a rust-inhibiting coat. Unweathered galvanized surfaces should be base-coated with good galvanized iron primer. Paint's medium-grey color lightens as it ages, but not due to chalking. However, the paint does chalk—but only mildly and slowly.

A CLICK OF THE SHUTTER . . .

MAKES A SLIDE IN MINUTES . . .



FOR TRAINING EMPLOYEES.

Double-Quick Slides for Training People

Takes just two minutes to develop a training slide at the Bristol Company. As a result, complex shop equipment set-ups can be easily brought into the classroom in slide form. Diagrams and drawings also are put on slides in a fraction of the previous time. And the cost of slides for training aids is cut 75%.

These time- and money-saving benefits began when company instructors started using the Polaroid transparency system—a simple way of making black-and-white slides with a regular Polaroid Land camera. Two minutes after photographing an instrument set-up or engineering chart, the instructor lifts out a finished transparency.

The Bristol Company runs its training school to instruct its own customers' employees in the use of automatic controlling, measuring, and telemetering products. Air-conditioned classrooms and laboratories contain more than 100 instrument models for group-demonstration and individual benchwork. But the small space forbids a complete product inventory. So instructors often rely upon slides to show instruments, attachments, line drawings, graphs, and engineering data.

When photographing an instrument set-up, for example, the trainer trips the camera's shutter. Then he pulls a tab to start the development process. A few minutes later the black-and-white transparency is ready. Next the instructor puts the slide in a small hand-held "tank" of emulsion-hardening solution for 20 seconds. After he places it in a Polaroid snap-together plastic mount, it's ready for use.

The training department shoots about 200 slides per year. Formerly an outside photofinisher prepared slides, after the plant cameraman took the shot, and made an 8x10 print. This took time (sometimes weeks) and was expensive.

Now, cost of each on-the-spot slide is only 55¢ for materials. That's quite a saving over the photofinisher's $2 charge. Total annual cost: less than $115 per year for 200 slides compared to about $400 under old method. The plastic mounts are re-usable.

Bristol uses 3¼x4-in. slides in standard lantern-slide projectors and 2¼-in. square slides in a special Polaroid projector. Line drawings and graphs are prepared by the engineering department on tracing paper. To photograph them the company uses a Polaroid Copymaker with built-in lights and copying lenses. In this set-up the Land camera is attached to the mounting post while the drawing is laid over white paper on the unit's easel (left photo). A special exposure guide table tells what copying lenses to use for a sharp picture.

Other uses for the two-minute slide system:

- Special programs for stockholders and plant visitors.
- Advertising, production, and marketing programs for field men.
- Recording of oscillograph traces and meter readings during instrument qualification tests.

Source: Charles Johnson, Manager, Education Department, The Bristol Company, Waterbury, Conn.

Costlier Material Really Cuts Cost

Buying a more expensive plastic laminate can be cheaper. Brevel Products Corporation (New York), makers of small gear head motors, got two benefits from this decision:

- Better gears.
- Less care in stamping because stock is tougher.

Second advantage means the company doesn't have to subcontra ' gear work. Over-all, cost savings topped 18% by using Grade L cotton-linen base phenolic (Taylor Fibre Company) instead of cheaper Grade C canvas-base laminate. Also means better use of machining facilities and improved product quality.

YOU BE THE ARBITRATOR

THE CASE OF

The Unauthorized Machinist

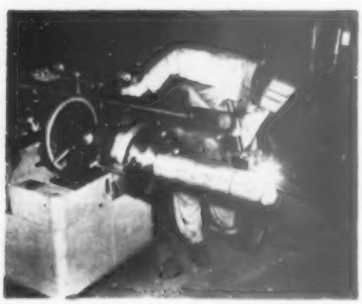
Out of the experience of the American Arbitration Association

A designer in a toy factory, working after hours, decided he needed a special mold for a new item under development. Since he had once been a machinist, he easily set up a metalworking machine, made the part in about an hour. When the union steward found out about this the next day, he protested. "The contract says a union man must do that kind of work," he reminded the personnel director. "That means you owe the man who was next in line for overtime one hour's pay at time-and-a-half."

Looking at the contract closely, management agreed the designer should not have done the work. "We made a mistake," the personnel manager said. "But the remedy does not lie in giving anyone pay for not working. We are willing to give the top man on the overtime list an extra hour's work. In fact, if you want, we can let him make the same part over again."

The union didn't agree to the solution. Although there wasn't much money involved, both sides saw it as a matter of principle and sent the case to arbitration. Suppose you were the arbitrator. How would you rule?

For the actual decision turn to page 138



Pipe Cutter Goes Automatic

Stainless steel pipe with diameters up to 10 inches is cut and beveled automatically by a new machine (photo) developed at General Electric's Hanford atomic energy plant (Richland, Wash.).

The machine combines two commercially available devices: the Mechanical Draftsman (Steffan Manufacturing Corporation) and a Heliarc cutting torch (Linde Company). Any shop with pipe-cutting problems could manufacture a similar device.

Here's how it works:

The Mechanical Draftsman automatically guides the cutting torch in a precise pattern, controlling contours and bevels. Four dials set up the machine. One is set to the inside diameter of the pipe being cut, another to the outside diameter of the mating pipe. This combination gives the cut the correct contour. A third dial controls angle of intersection of the two mating pipes. The fourth dial regulates the distance of offset when one pipe meets a larger one off-center. A master button starts the machine, ignites the torch, times the cutting cycle. In a matter of seconds the cut is finished and the torch shuts off.

With the old method, cutting and fitting pipes for welded joints was an expensive, time-consuming, five-step process. First a layout had to be made, then the pipe had to be marked, sawed, and burned. The cut was hand-ground and beveled to proper fit. Now the machine takes care of all this in one simple operation. Waste is eliminated, shop time is saved, and the quality of the joints is improved.

Pallet Racks Save Storage Space

Flexibility, efficiency, economy. That's the claim for the interesting pallet-rack combination shown above. The metal pallets are in wide use in Norway. But the racks were developed by engineers at Stord Verft, shipbuilding and engineering works, for use in its general stores area at Stord, Norway.

The racks are steel tubes extending from floor to ceiling. Brackets, placed strategically, support the metal pallets. Absolutely no crossbars to get in the way. Thus all storage space available is put to maximum use.

As for the pallets, they're made of tubing too. Measure roughly 3x5¼ feet, can take a 3200-lb. load. When not in use they nest, thus saving 75% of the storage space needed for conventional pallets. They can also be fitted with posts and collapsible side frames.

The racks cost $17.50 per section —less than half the price of other

racks. The pallets, however, were more expensive than conventional units—$12.20 each. This added cost will be spread over a longer depreciation period.

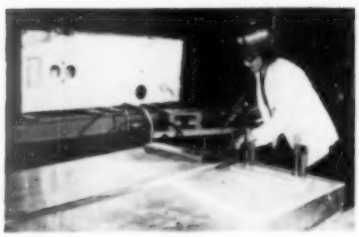
Shop Tools Run on Inert Gas

If an inert gas system serves your manufacturing process, it may be cheaper to use gas than air for power tools. Especially if your air tools are used for short periods. Sinclair & Valentine Company found this was true at its new Secaucus (N. J.) ink plant.

Sinclair & Valentine production people connect the portable air tools to 100-psi. inert gas lines whenever they're needed on a job. Since these tools are only used intermittently, the added cost of using the more expensive gas is small compared to the initial cost of installing a compressed-air system.

The inert gas is available throughout the S&V plant. It is used to blanket flammable ink and varnish mixing and blending operations as well as to purge vessels. This keeps atmospheric oxygen from deteriorating ink quality, eliminates explosion hazards, and helps retard evaporation of highly volatile solvents.

Inert gas is produced in a 2000-cfh. automatic CO_2 generator. After filtering, the gas is compressed, and then stored in a 2000-cu.-ft. pressure tank. The gas contains nitrogen and small amounts of other inert gases as well as CO_2.



Welds Thin Panels

There's no more trouble welding large panels of light-gage aluminum at Westinghouse Electric Corporation's Electronic Division in Baltimore. A newly developed hand gun for gas-shielded, consumable electrode welding does the job just fine. Saves roughly $50,000 annually.

With this gun there's no distortion of large panels because of welding at high heats. It welds with limited heating of parts being joined. And since there's no distortion, costly fixturing and straightening equipment is eliminated. Operator in the picture is welding large unsupported panels from 0.090 to 0.125 inch thick. Some parts require tolerances up to ±0.005 inch to assure proper fit.

Ideas on a Drum

Here's a novel idea in employee communications as well as education. If you want to buy a Chihuahua, a glance at the "library" stand's revolving drum bulletin board will tell you if there's one for sale. Same stand holds all sorts of booklets and pamphlets for employee use at the U.S. Bureau of Reclamation in San Francisco.

The rotating drum has over 6 feet of posting space. It offers employees wanted and for-sale items and contest news, as well as local and national news, on three plastic strips. Strips are spring-tensioned and easily changeable. Normally the drum, powered by a small motor, revolves continuously. But if an item warrants longer attention, an employee can stop it by just pushing the button at right.

Above the drum a bookcase contains booklets and pamphlets on suggestions, idea creation, and "How to Win" contests. Employees can check out items of their choice on a loan basis. Stand was built by Reclamation office employees on their own time. They maintain it by contributing books and information.

CASE BOOK CAPSULES

Closed-circuit TV helps U.S. Navy transmit four times as much information as present systems. Developed by General Precision Laboratory Inc. (Pleasantville, N. Y.), it shows over 60 lines of small clear type at one time.

Electronic data processing system tied into a 12,850-mile Teletypewriter network boosts efficiency for Owens-Corning Fiberglas Corporation (Toledo, Ohio). It steps up processing of rush sales orders and other paperwork between eight plants and 36 offices.

X-ray diffraction points up source of fires for a West German insurance company, reports Philips Electronics, Inc. (Mount Vernon, N. Y.). Copper wires examined by x-ray reveal temperature differentials that help plot source of trouble.

Engine that burns any liquid fat or oil was displayed at Chicago's International Trade Fair in July. Its developer, Automobiles M. Berliet (Venisseaux, France) believes it is the most important step in internal combustion engines in half a century.

Completely automatic machine molds plastic shoes and heels at press of a button. Increases output, lowers costs. International Vulcanizing Corporation (Boston, Mass.) is distributing an improved model of the British machine.

Three quality control standards in the Z1 class have been updated by American Standards Association, New York: Guide for Quality Control, Control Chart Methods of Analyzing Data, and Control Chart Method of Controlling Quality During Production.

High-speed automatic welder completes pass on 4-in. aluminum pipe in 11 seconds. Produces sound welds with full penetration and no back-up rings. Narrows price gap between aluminum and steel pipelines, says Aluminum Company of America (Pittsburgh).

DRAW FORMER STRETCHES MISSILE SKINS

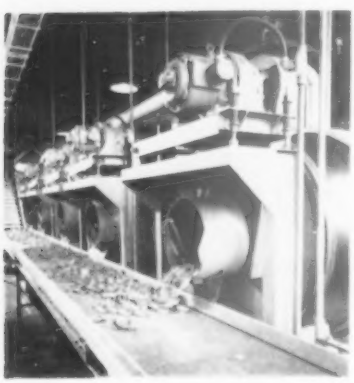
The 0.040-in.-thick skins for the Atlas ICBM take final form on this giant stretching machine at General Dynamics Corporation's Convair Astronautics Division in San Diego. The machine locks a sheet of stainless steel in the jaws of the turntable gripper unit (center) and the stretcher ram (left). Then the 37,000-lb. turntable rotates counter-clockwise, wrapping the sheet around a die. The 93-ton radial draw former can stretch a 20-ft. sheet of stainless up to 18 inches. Pieces formerly welded from several sections can be made in one operation with this machine. For special contours a compression shoe (not shown) forces the metal into die.

Everything Deluxe

Latest employee facility at the Eastman Kodak Company (Rochester, N. Y.) is a five-story addition to the company's 11-year-old recreation building. Featured is a 2223-seat auditorium with a 72-ft.-wide by 37-ft.-deep stage. The auditorium stage can accommodate almost any kind of stage presentation and motion pictures, including those using the Cinemascope process.

One of the unusual design points in the auditorium is the location of sound and lighting control booths. They're at the rear of the main floor rather than in the wings. This permits operators to see and hear the effects they create. Two large meeting rooms can be subdivided into seven smaller rooms. These can be used as dressing rooms in stage presentations. In addition, there's office space for those concerned with employee activities, public relations, plant tours, the company newspaper, and the employee suggestion system.

Construction of facilities for the Kodak Camera Club, with its 10,000 members, has begun in the basement of the new building. Future plans also include installation of 20 bowling alleys for the exclusive use of company employees.



Tumble and Wash Made Automatic

Spewing loads of molded plastic caps, these giant machines are part of an automatic tumbling and washing system at Armstrong Cork Company, Lancaster, Pa. One man monitors the system for removing dust and flashing from the inside and outside of caps. Mechanizing this operation has offset rising costs by cutting material handling labor. And eliminating hand shoveling of dust into hoppers for disposal has improved working conditions, too.

Process begins when the traveling overhead crane hoists a barrel of molded caps and dumps them into one of five tumblers. After a pre-set cycle, a timer stops the tumbling action and caps spill onto a moving belt conveyor leading to the washing operation. Dust and particles collected in the tumblers are sucked into collecting bins outside the building.

There's no mixing different caps on the conveyor belt, either. An electronic scanner prevents one tumbler from discharging if another is ejecting its load. From the conveyor, caps spill into a washer. The washing cycle begins in a 20-ft. long perforated drum with a 4-ft. diameter. Here caps are immersed in water-soak wash, then rinsed and drained twice. Next they pass to a large drum, where hot air blasts dry them before they are dumped on another conveyor. After inspection, caps are automatically counted and packaged.

Portable Clamps Boost Output

This fast clamping device can move from machine to machine, thus cuts production time and saves tooling at Mission Manufacturing Company, Houston. A portable air-hydraulic booster system provides the power

for clamps on the machine bed. These clamps replace nut-and-bolt set-up clamps.

Mission's tool engineer built clamps into fixtures for slabbing the face of plug valve core halves and holding rock bits for milling of a carbide insert slot. Power source has quick-disconnect couplings and a self-feed system to compensate for loss of hydraulic fluid and to act as a bleeder. Mounted on portable table, system can be used to increase output of several machines without additional tooling costs.

TV CAMERAS ARE MAINTENANCE INSTRUCTORS

The cameras and cameramen in the photo above make it easy for trainees to master the techniques of computer maintenance. Trainees stay in the classroom at International Business Machines Corporation's new Poughkeepsie education center while an expert lectures them from the plant area via closed-circuit TV. This way, every man in the course gets an ideal view of instructor and machine, gets maximum impact from the day's lessons. IBM managers, executives of customer companies, and others can get similar training. With two cameras in the Data Processing Department (photo), there's a choice of angle and distance for best effect.

Second Survey Reveals a Change

But it wasn't exactly what the company expected. This second attitude survey at the San Diego Gas & Electric Company showed a surprising drop in favorable comment. Like the first ballot taken some six years ago, this second questionnaire asked employees to rate the company as a place to work.

Answers six years ago were favorable. Most employees were satisfied with their jobs, working conditions, and supervisors. Some 3380 unfavorable comments and 1290 suggestions were analyzed in weekly meetings. And the following steps were then taken:

- Employee purchase of stock at option was invited.
- Rest periods and coffee breaks were started.
- Job bidding system was revised.
- Merit rating became the basis for individual pay raises.
- Employee discount on gas and electric bills was initiated.
- Workmen's compensation benefits were expanded.

Late last year the company asked the industrial relations section of the California Institute of Technology to make the second poll. Questionnaires were sent to 2616 employees. Almost all responded—and 85% included comments in addition to the written answers. Then came the big surprise.

The poll indicated an improvement in employee attitude toward pay and management interest. But the general opinion toward the company showed a definite drop. And the poll uncovered big differences in attitude among departments in the company, reflecting a difference in approach and methods. One reason for this was found when a comparison was made of employee answers to the following question (according to CalTech Prof. R. D. Gray):

When desirable job vacancies arise, how do you think they are generally filled?

	1953	1958
By outside people	4.0	3.4
By favored employees not qualified	26.4	30.8
By people with long service	13.4	11.6
By those of greatest ability	8.7	9.7
By service and ability	43.9	41.4
No answer	3.6	3.1

And there could be another reason for a drop in favorable attitude, said Prof. Gray. Many employees who might have been hesitant for one reason or another to register their true opinions in the 1953 poll were more outspoken in the recent poll. They discovered there were no repercussions from speaking one's mind in the earlier survey. They're convinced the survey is a completely confidential project. Answers were punched on IBM cards and the original questionnaires were destroyed to prevent any possible disclosure of an employee's identity.

But the results of the poll were considered fruitful. For example, here are some tips management is ready to investigate:

- Greater attention should be given to broadcasting information about company activities, operation, and policies.
- Steps should be taken to remove the widespread impression that favoritism is the determining factor in filling jobs.
- Employees should be told personal discussion with supervisors regarding job problems and personal matters is welcomed.
- More attention should be given on-job training and coaching.
- Greater interest in good working conditions should be shown.
- Added emphasis should be placed on safety measures.
- Regular job-performance discussions should be held with employees.

SIMPLE IDEAS MAKE CONVEYORS DO NEW TRICKS

Here's how the British pharmaceutical house of William R. Warner, Ltd. (Eastleigh, Hampshire) adapts conveyors to its specialized needs. What looks like a maze at the fun house (left) is really a devious, time-killing route for cooling brilliantine. Two 6-ft. planks are cut so they provide an interlocking "dog tooth" pattern over a slat conveyor belt. Jars of warm liquid brilliantine start through the zigzag maze at one end. By the time they reach inspection at the other end, contents are cooled and solidified. Straight-line travel would get them to the inspection end too soon for packaging. Planks are not fastened down but are supported by flanking benches on either side of the belt. And there's a ½-in. clearance so the boards don't interfere with the conveyor.

The numbers on the conveyor at right are not for gambling. But they do speed up packaging tubes of medical products. Each operator has a number corresponding to one on the conveyor belt. She packages tubes only on her number. Then she replaces packaged units on the next section with the right number when it comes up again on moving conveyor. Controlled conveyor speed allows each girl enough time to put tubes in cartons and have a short relaxation period. All girls work at same speed, thus output can be calculated for any given period.

Bottom Knocked Out of Packaging Costs

Use of slotted steel angle for packaging switching equipment has reaped big savings for Kellogg Switchboard & Supply Company, Chicago. To date, savings add up to approximately $100,000. And the program is just getting into full swing. These savings resulted from having the slotted angle returned for re-use after installing equipment.

Here's how the new packaging approach fits right into Kellogg's production operations:

Before actual assembly on a switching system begins, a frame of slotted angle is bolted together. Then switching equipment mounted on six shock absorbers is assembled within the steel framework. For ease of movement, the entire set-up rests on a dolly bolted to the framework. Slotted angle frames measure 5 feet high by 2 feet deep. They can be 9 or 12 feet long depending on the system being built.

When the equipment is ready for shipment, wheels are removed and an $8 piece of corrugated material is wrapped around the frame holding the switching system. This protects it from dust and dirt in transit. Other expendable packaging items used cost another $3.

In the field, engineers roll the switching system into the operating position. Then they remove the corrugated cover and discard it. But the slotted steel angle is unbolted and returned to Chicago.

Kellogg uses 75 of the 12-ft. frames and 50 of the 9-ft. frames to keep up with its current need. Sections of the frames were custom-fabricated by Acme Steel Company (Chicago) to Kellogg's specifications. Formerly Kellogg used plywood boxes to ship switching equipment. This meant an average expenditure of $89 per unit. Now losses on expendable packaging material only run about $11 per unit.

Faster, Safer Bulk Unloading

Interested in cutting bulk unloading time by 50% while increasing safety? That's what Barber and Bennett, Inc., did at its Albany (N.Y.) feed mill with an electric dragline shovel. Five or six carloads of bulk are unloaded daily.

Formerly, with a mechanical shovel, it took two men about four hours to unload a 40-ton rail car of soy meal and two hours for a 20- to 30-ton car of linseed meal. They started operations at door of car and worked toward ends. If shovel accidentally tripped, it continued sliding and skidding, thus created hazard.

With the new shovel one man can unload an entire car starting from

either end. Shovel burrows into most resistant materials. If shovel trips and operator loses grasp on handle, shovel stops. Pushbuttons in handle must be depressed before shovel functions. Munson Mill Machinery Company (Utica, N. Y.) manufactured the shovel.

Boiler Room Looks Like a Home

A house is not always a home. And certainly not when it's a boiler room. When the engineer at Lake Shore Management Company, Chicago, got tired of looking at the same old bare pipes, he started collecting pieces of scrap from the shop. With a wall added here, a roof there, a coat of paint and a few decorative pieces, a replica of a small house emerged.

Only item purchased was the house number, 201½. It's just ½ more than the number at the Lake Shore Management Company, where the "house" stands. In front of the structure are a birdbath and a white picket fence. Inside are clothes lockers, benches, and mirrors.

Reprints of the Plant Operating Case Book are available. Price 50¢. For quantity prices write Reader Service Department, FACTORY, 330 W. 42nd St., New York 36.

No-Duct Ceiling

Looking for a low-cost system to distribute cool air without installing a maze of ducts? The Carnation Company of Los Angeles does it with a hung ceiling. It provides −25 F. temperatures in its 120x160-ft. ice cream hardening room. This plenum cooling system being installed in the above photo eliminates ductwork by using a false ceiling 24 inches below the real ceiling.

Aluminum tees supported by wires from the real ceiling form the frame for the false ceiling. The paneling is fir plywood treated with a tough, smooth, resin-fiber, medium-density overlay. Thus the rigid, easy-to-install panels have low condensation properties.

Into space between the real and false ceilings, cooling units discharge refrigerated air. Thirty air diffusers then feed this air evenly into the hardening room below. Soft ice cream enters this room on conveyors. It's loaded onto pallets to harden for eight hours.

To prevent loss of refrigeration, loading of ice cream is done from two 25x54-ft. anterooms. They act as buffers between the hardening room and normal outside temperature. Outer doors of one anteroom are faced on interior with 8-in. thickness of foam rubber and covered with canvas. During material transfer, these revolve back 180 degrees against outer wall. Thus when refrigerated relay vans back up against foam rubber a seal is formed, preventing loss of cold air. Inner doors of anteroom then slide open and fork-lift trucks carry palletized ice cream to vans for storage in outlying factory branches.

Through the other anteroom fork-lift trucks haul pallets to a shipping platform. There ice cream is taken off pallets and transferred to wholesale delivery trucks.

Four Tips on Re-Using Water

Costs money to buy water *and* to flush it away. That's why Westinghouse Electric Corporation's East Pittsburgh plant has a money-saving water-reclamation program. With it, Westinghouse has cut water and sewer costs, reduced maintenance, and improved water quality for cooling and boiler use.

Maybe a similar program would work in your plant. Here are four tips on how it's done:

1. Re-use water from air conditioning, process cooling, and testing wherever possible. The Westinghouse plant has a total cooling-tower capacity of over 20,000 gpm. In addition, individual cooling systems service air conditioners of 20-ton capacity and up. On smaller-size units water returns to a central cooling tower.

Water can be cooled and recycled at an average cost of 2¢ per gallon. This is only 6% of the cost of purchasing and paying for the removal of water by the Sewer Authority. Resultant savings have paid for the average cooling-tower installation of 500-gpm. capacity or over within two years.

2. Eliminate intermediate cooling if the temperature rise in a process is small. In this case, water is pumped directly to other users in the plant for re-use. Thus an engineer's alert eye for temperature differences can minimize investment in cooling equipment.

3. Filter and re-cycle water where only wetness is required. For example, in grinding operations with continuous filters, only make-up water to compensate for losses needs to be added.

4. Return uncontaminated waste water to condensate lines of the plant heating and steam system. This return water can be added to large quantities of make-up water required by most power-plant boilers. Additional water treatment is a minor problem because all return water is run through the same softeners. This use of condensate return lines is possible because when cooling-water demands are high (in summer), condensate return is low.

Source: C. J. Zetler, Jr., Plant Engineer, Westinghouse Electric Corporation, East Pittsburgh.

New Way to Find When to Buy

Hold your tongue next time your wife comes home with a new hat and says: "I couldn't afford *not* to buy." Her logic may not be so bad. The hat could cost even more if she waits to buy it. Same way, you may find yourself paying more if you delay your capital equipment purchases at the plant.

On your wife's side is Jones & Lamson Machine Company (Springfield, Vt.). The company has developed and tested a new replacement formula for capital equipment. The new formula helps you evaluate equipment purchases in terms of the costs to avoid in the future rather than the savings to expect now.

Avoidable costs—In the Jones & Lamson system for analyzing replacements, "avoidable" costs are listed and summed for one year. That's the first step. In all, at least 10 costs are affected:

1. Direct labor. It's usually reduced. So the cost of labor using old equipment, less the cost of labor (for same production in one year) needed to operate new machinery, represents an avoidable cost.

2. Indirect labor. It's usually affected. Fewer production employees may mean fewer supervisors. Better accuracy of manufacture may reduce the number of inspectors. Any saving is an avoidable cost.

3. Fringe benefit payments. You may add them to the avoidable labor costs saved through purchase of the new equipment.

4. Spoilage in manufacture. This is another avoidable cost. Pieces not scrapped or reworked represent costs that don't occur.

5. Routine maintenance. On new equipment it may drop because of less lubrication, cleaning, chip removal, and coolant servicing. Or it may require more.

6. Repair maintenance. You can estimate it for the new machine and compare it with that for the old. If your old machine requires heavy part replacement, or if the new is more delicate and complicated, future costs will be affected.

7. Power consumption. It will differ between old and new machines.

8. Perishable tool costs. This may show a change, too.

9. Taxes and insurance. They'll probably increase if you buy a new machine tool to replace an old one.

10. Depreciation and obsolescence. They affect avoidable costs. The cost of the new equipment, its remaining depreciable life, and obsolescence (if it's an important factor) all enter into the net figure.

Other costs may be avoided in addition to those above. For example, a numerically controlled machine tool can reduce the need for jigs and fixtures. Their cost should be entered into the sum total of costs the new machine will avoid. Adding all cost changes—and don't forget to subtract the red figures—will give you a total avoidable cost for one year.

Rising rates—After computing the total avoidable costs for one year, J. & L. projects future costs to evaluate the effect of time. These projection figures are based on historical data compiled by the U.S. Bureau of Labor Statistics. You may have some better basis for predicting the future costs in your own operation. "If so," says J. & L. Controller Norman T. Harrison, "you should use it."

To see how the approach works, consider the purchase, at $31,500, of a numerically controlled positioning table for a radial drill with a 10-year life. Considering all factors, say total avoidable costs for one year are $14,205. To find the effect of postponing purchase for six years, the figures look like this: In five *more* years at current prices the total avoidable costs will be 5 times $14,205, or $71,025. But higher labor and material costs will boost total avoidable costs by 21.55% over this period, adding $3925. And the cost of equipment will be up 38%, or $11,970. Thus total avoidable costs for six years come to $101,125.

Ratio for comparison—The new replacement analysis method also can be converted into a ratio for comparing competing capital equipment purchases. You get the ratio by dividing total avoidable costs by cost of equipment. In the example above, the ratio would be 321% ($101,125 divided by $31,500). Ratios for comparing equipment should be calculated on avoidable cost studies for the same period. A five-year ratio is not comparable, for example, with a 10-year ratio.

YOU BE THE ARBITRATOR

Continued from page 132

The award—The arbitrator made a compromise ruling. He said that giving the aggrieved employee overtime work in compensation was no solution. It would just take that amount of work away from someone else in the bargaining unit. Thus the only remedy was an hour's pay. On the other hand, there was no evidence that management would have ordered the mold made on overtime. If the designer had properly observed the contract, the mold would have been made during regular hours. So the arbitrator awarded one hour's pay at straight time to the man indicated.

Caution: The award in this case is not an indication of how other arbitrators might rule in other apparently similar cases. Arbitrators do not follow precedents. Each case is decided on the basis of the particular history, contract, testimony, and other facts involved.

Giant Skylights

There's natural light aplenty at the new warehouse of E. T. Eaton Company in Saskatoon, Saskatchewan. Why? Eight giant skylights run almost the full length of the building. Each measures 163 feet long by 5 feet wide, is made up of 11 prefabricated sections.

At the job site, workers quickly and easily installed the panels (The Marco Company, East Orange, N.J.). Panels consist of curved translucent corrugated sheets of polyester resins reinforced with glass fiber matting.

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Send for Bulletin SC-3.

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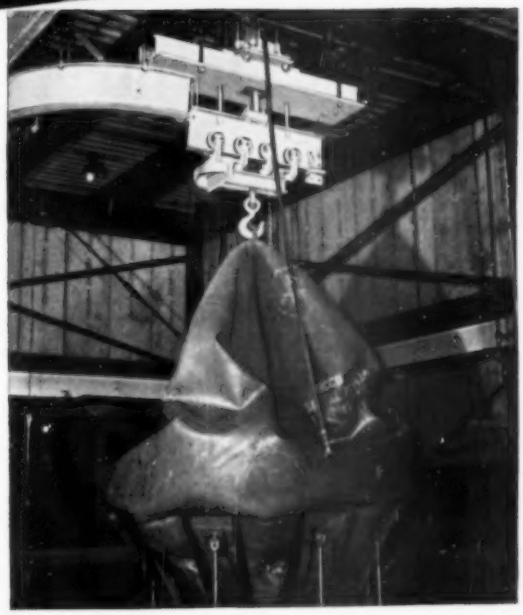
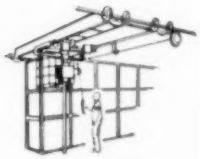
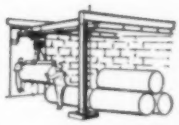


AUTOMATIC DISPATCH



STACKER CRANE



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Mill-scale paint failure like this costs industry big money. You'll see . . .

Billion-Dollar Paint Thief

It's mill scale. It hits every plant—including yours. If you don't know how it hurts you—and how to handle it—here's the help you need.

MANY MILLIONS of gallons of paint are wasted each year on steel surfaces (photo above). Figure in the labor, and the bill could run over a billion dollars for the United States alone.

To give you a firmer grasp of the dollar waste involved, here's a simple evaluation. An average good industrial paint job averages 35¢ per square foot in direct costs. If applied over mill scale it will fail positively and prematurely. Thus it's money thrown away. And then the cost of properly preparing the surface for repaint is usually greater than if it had been done right at the start. As you'll see later, maybe over eight times greater.

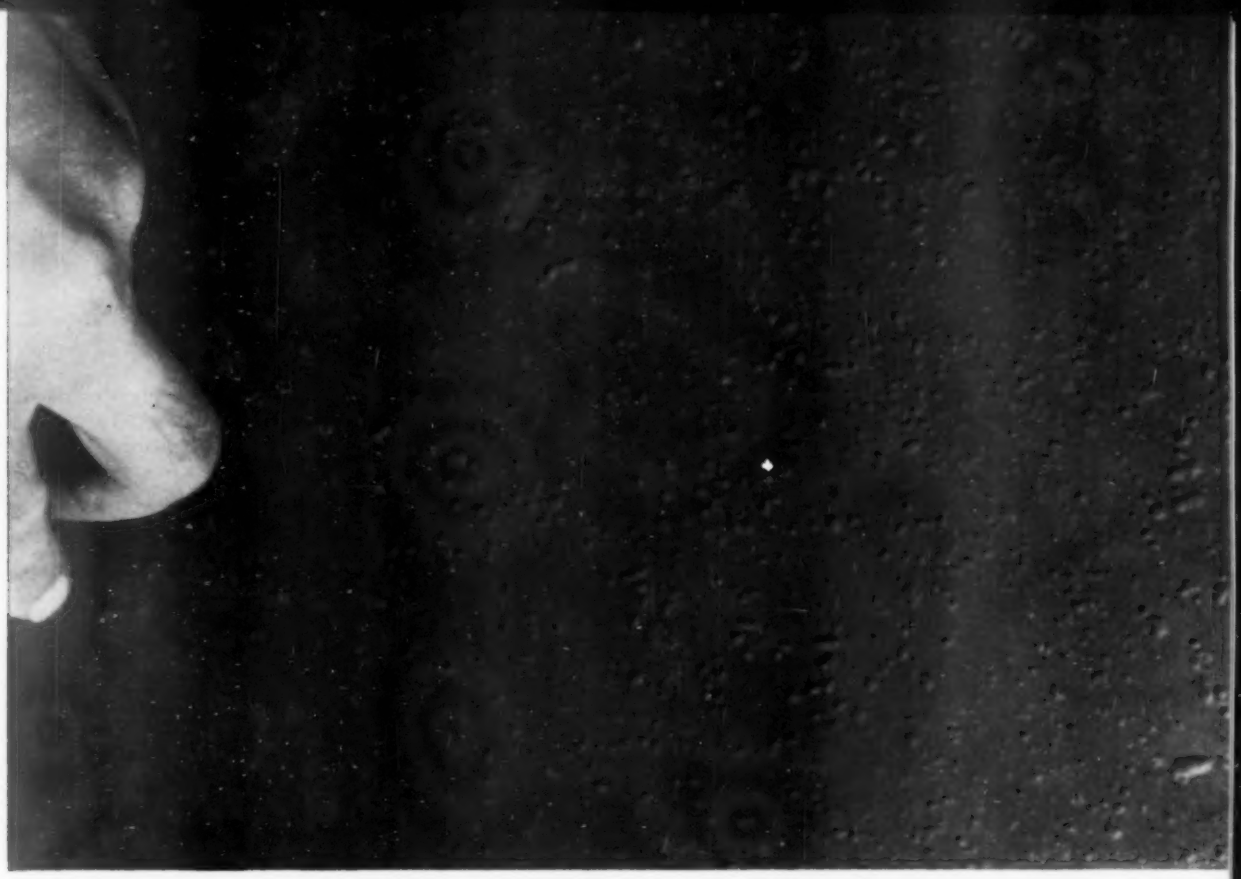
These figures are not plucked out of the air. They are cited by Ken Tator of Kenneth Tator Associates (Coraopolis, Pa.), a leading corrosion engineering consultant, in a recent interview on this subject with editors of FACTORY.

What's back of this fantastic claim? The waste, says Tator, stems solely from mill scale (a kind of rust) on most fabricated steel surfaces. Failure to remove this scale results in spalling of the surface—often acutely. And in this process, the paint coating goes with it. It may happen within three months. Under ordinary conditions it happens within one or two years. So it's a fair conclusion that the plant that paints over mill scale is throwing good money away.

What does this mean to industry? Plenty, according to Tator. "Outside of the major process industries, over 75% of the paint failures I am called on to diagnose are caused by painting over mill scale," he says. The process industries are exempt, he continues, because they have already learned this lesson through experience with their own severe exposures.

That's not all. Wherever base steel is exposed through peeling mill scale, an electrical corrosion cell is set up. This causes rapid pitting. In salt atmospheres a ¼-in. steel plate can be perforated in two years—twice the rate of a mill-scale-free section.

Turn the page



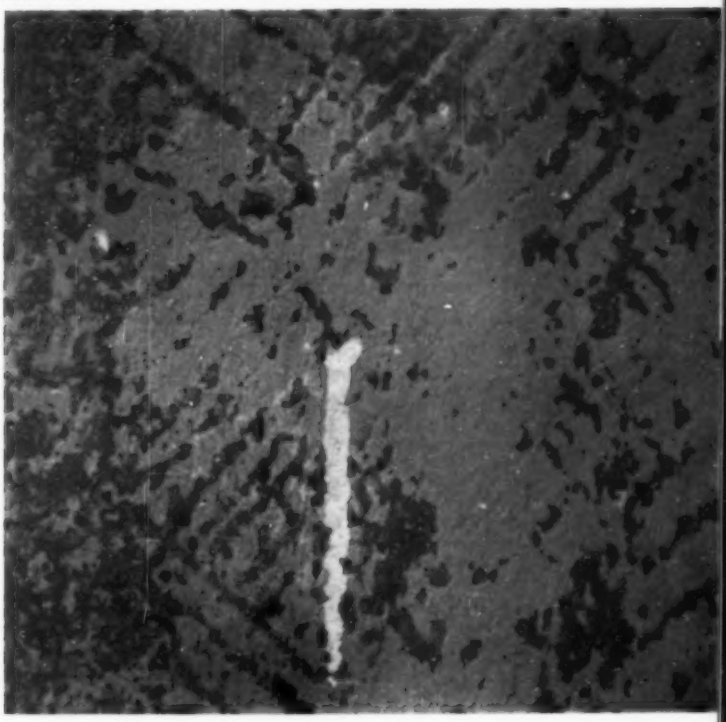
. . . the first signs of failure in small eruptions like these . . .

. . . or streaks (from rolling)

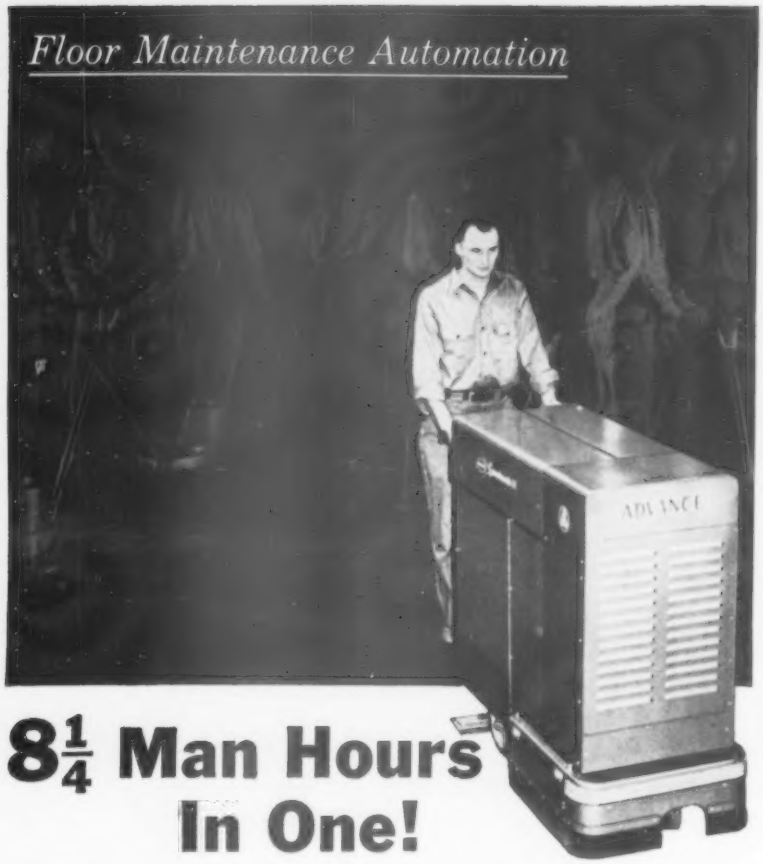
ACTUAL SIZE

. . . or herringbone (from fabrication)

HALF SIZE



Floor Maintenance Automation



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MILL-SCALE PAINT THIEF

Begins on page 140

Product contamination from loosened scale is another penalty that's important to food, textile, or precision industries—or to any industry where cleanliness is a big factor. Loose particles can drop from overhead structures or framework, or fleck off tanks or containers.

Stubborn trouble—To solve these problems, many plants clean off the offending surfaces, wire-brush them, then repaint. What they don't know is that no paint will permanently stop mill scale from flaking off. A few paints with unusual penetrating qualities will retard it. But unless mill scale itself is removed, the cycle of peel and repaint is inevitable. And severe damage to structural members may eventually result through loss of design strength or perforations.

Why doesn't industry do something about the continuing waste of paint from mill scale? Just one reason, says Tator: "Industry doesn't know a paint failure caused by mill scale when staring it in the face." What's more surprising, most professional painting contractors seem to be just as naive. As a result, such failures are usually attributed to other causes—inadequate surface preparation, poor selection of material, or atmospheric causes.

But such ignorance can be easily overcome. The facts that follow are couched in non-technical terms to show what mill scale is, how it behaves, and how you can treat it. And all you need to locate the culprit in your own plant is good vision.

HOW MILL SCALE ACTS

What is mill scale? It's formed on the surface of hot-rolled steel in the producing operations in the steel mill. Initially it's a tightly adherent, hard, almost vitreous black coating. It's a kind of rust (an oxidation product) formed when the red-hot billets or shapes are exposed to air. In time this scale tends to change to the more voluminous common red rust from exposure to atmosphere and weather. Thus the scale loses its adhesion to the base steel, can be readily removed. High humidity and moisture, breaks in the scale, and thermal expansion and contraction of the base steel will accelerate flak-

Machinecraft gets .0005" tolerances with Cities Service Chillo Cutting oils!

Machinecraft, Inc., of Whitman, Massachusetts, makes a product that is surely the answer to many a textile man's fondest wish.

In place of old-style solid arbor top rolls, which often drip lubricant onto the fabric, Machinecraft has developed "the anti-friction top roll."

Operating on ball bearings, this unique invention requires almost no lubrication, therefore eliminates staining problems. In addition, it permits higher speeds of operation and produces more uniformly woven fabric.

In all of this, extremely intricate machining is required —and Cities Service Chillo Cutting Oil plays a crucial role.

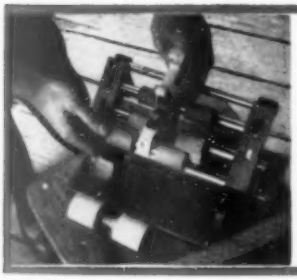
Using Cities Service Chillo "A," Machinecraft is actually achieving tolerances as fine as .0005"! Moreover, Machinecraft reports that Chillo "A" gives "excellent tool life, produces a fine finish, has unusual stability, and offers continuous quality from batch to batch."

"In addition," continues this well known firm, "Cities Service provides us with exceptional technical assistance and good delivery service."

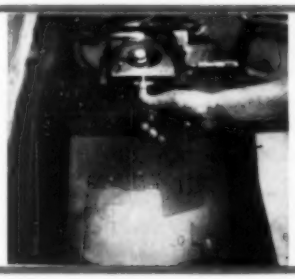
There's little to add to what Machinecraft says except a reminder that *you* can expect similar results with Cities Service, too. Talk with a lubrication engineer from the nearest office. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS



Machinecraft's Anti-Friction Top Roll is rapidly replacing old-style solid arbor type top rolls in textile mills. It prevents staining, permits greater operating speeds.



Shadowgraph is method of checking accuracy of precision machined parts for anti-friction top roll. Machine magnifies and projects the part's shadow outline. Tolerances are as fine as .0005".

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MILL-SCALE PAINT THIEF

Begins on page 140

ing. So will mechanical shock or flexing of the base steel member.

Depending on atmospheric exposure, mill scale may lose adhesion in as little as a month. But in warm, dry exposures at uniform temperatures, it may take two to three years. Vessels operating at continuously elevated temperatures have been known to show no mill-scale failure after eight years. Experts presume that moisture is the arch criminal and that flexing, expansion, and shock are merely accomplices—accomplices that open new cracks to moisture that forms more rust.

If mill scale occurs only on hot-rolled steel, why is this industry's problem? Because 95% of all structural shapes and plates used in construction of industry facilities are hot-rolled. Industry employs such materials in building structures, equipment, service lines, and tanks. It can't escape the problem. Thus the sooner it learns to diagnose (or anticipate) mill-scale paint failures, the better.

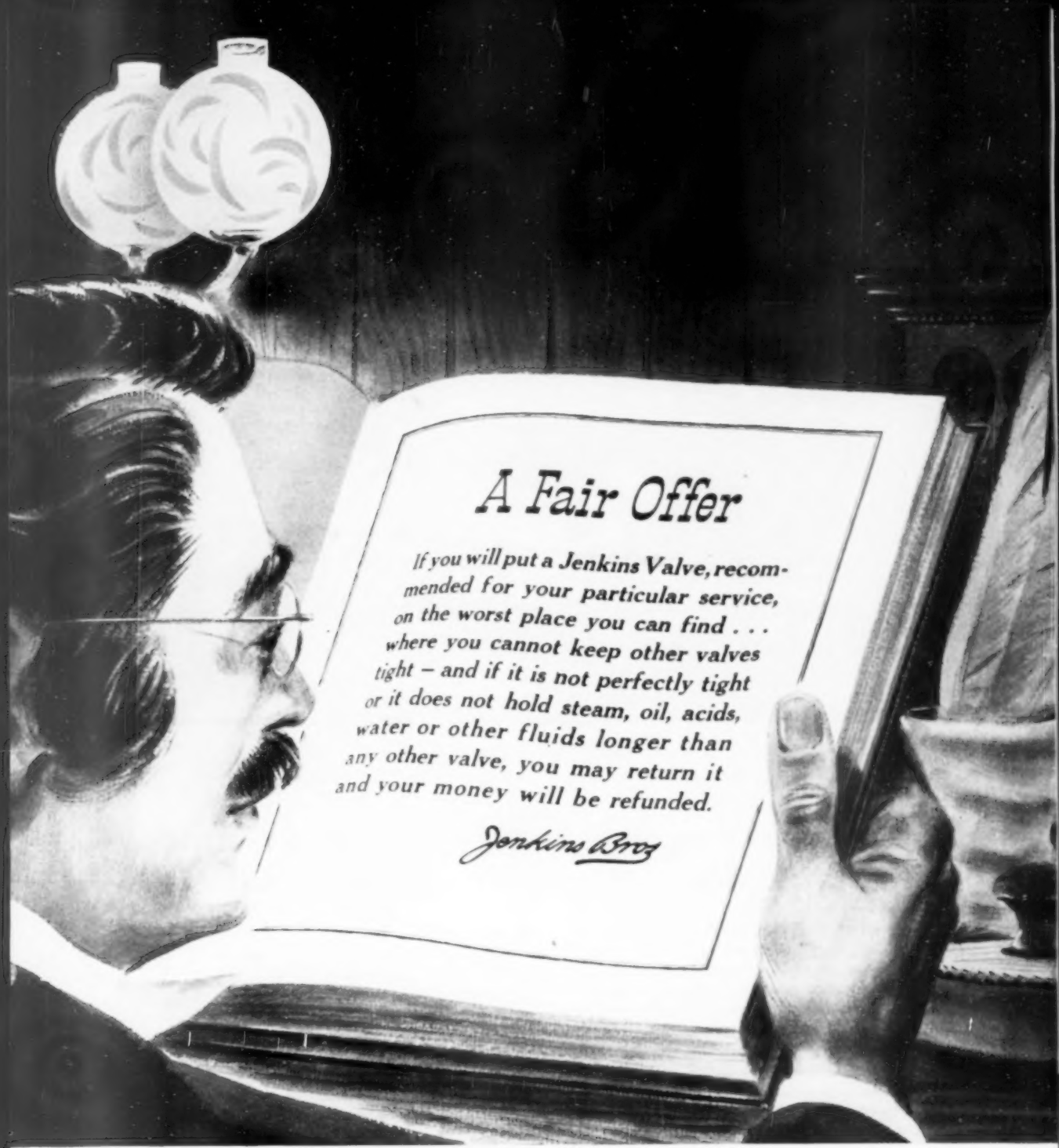
Diagnosing failures—It's not hard to do. The four photos on pages 140-41 show the progression of mill-scale paint failure. Two telltale clues are the broken-out streaks or criss-cross patterns of rust on the steel surfaces. These never occur from improper surface preparation or misapplied coatings.

An excellent aid to identification of mill scale has recently been made available by the Corrosion Committee of the Royal Swedish Academy of Engineering Sciences. The study includes matched sets of 32 superb color photos showing steel surface appearance for each stage of rust deterioration and mill-scale failure. Other photos define the steps in surface preparation. Brief explanatory text is duplicated in English, Swedish, French, and German, thus making the work an internationally acceptable standard. (Price is $35 per copy, available through Kenneth Tator Associates.)

HOW TO BEAT THE COST

There's only one sure way, says Tator: "Take mill scale off in the first place."

Here you may get some argument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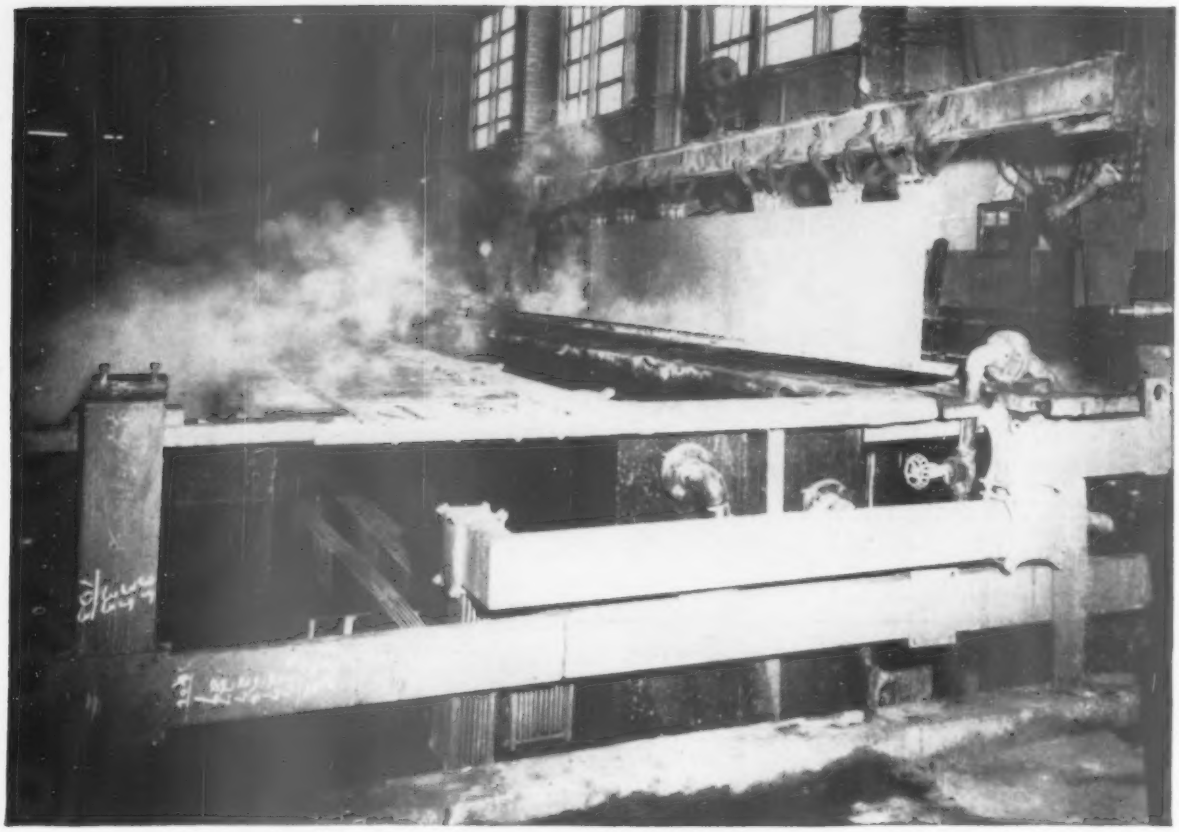

—Mr. L. P. Vollmuth, V. P. of Bart Mfg. Co., Belleville, N. J. talks acid tank protection:

"Bitumastic coatings have given us 2½ times the service life of more expensive materials"

Bart Manufacturing Co., producers of "Lectro-Clad" plate, pipe fittings and other electroplating processes, has a really tough corrosion problem on plating and pickling tanks. Protective coatings must withstand the fumes and occasional spillage of hot sulfuric acid and alkaline cleaning solutions. An expensive, complex coating system applied to the submerged tanks failed in just one year.

The tanks were removed from their pits, cleaned and given two coats of Bitumastic No. 50, the heaviest of the coal-tar based Bitumastic coatings. That was back in 1956 and on recent inspection, the Bitumastic coating system is still sound with no sign of deterioration. Bart makes extensive use of Bitumastic coatings in its other plants, too, where protection of chemical equipment is required.

Our files are filled with case histories like this, where firms have found coal-tar based Bitumastic coatings the answer to tough corrosion problems. We'd like to send you more information for your evaluation of these materials; it is likely they can help in *your* corrosion-prevention program as well. Use the coupon below, or write Koppers Company, Inc., Tar Products Division, Pittsburgh 19, Pa.

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MILL-SCALE PAINT THIEF
Begins on page 140

from researchers who claim that intact, adherent mill scale is an excellent paint base and doesn't need removal. Tator replies: "There's no question, paint will adhere satisfactorily to mill scale. I've never seen paint film losing adhesion to the mill scale, even when the scale itself is failing and losing adhesion to the base metal."

This is another way of saying there's no such thing as intact, adherent mill scale. It's just a matter of time before the stuff flakes off. If the surface is always hot, dry, and kept at even temperature (as on an autoclave or equipment in a boiler house) you can get six years of paint life. But give it moisture and temperature variations (as in open weather) and you'll do well to get more than a year.

New installations—Obvious question now is, why paint new steel at all? Two main reasons: appearance and metal protection. Unquestionably a proper protective coating retards corrosion and pitting. Granting the need for painting new facilities, a plant engineer has these choices for mill scale removal:

- Remove it at the mill. Specify removal of all mill scale by fabricator before shop priming. In this case you'd be wise to send an inspector to see that the job is being properly done.
- Remove it at your plant. Specify shipment of material without shop primer. This way, you must plan for scale removal at the plant.
- Galvanize. Specify equipment to be galvanized. This requires a pickling treatment that automatically removes mill scale. Cost may be a bit higher than doing your own sandblasting, but you have a good sacrificial (protective) base on which to paint. Painting a galvanized surface is no longer a problem, if proper primers are used.

Sometimes it's best to remove mill scale at your own plant. If so, don't rely on wire-brushing or flame-cleaning methods, says Tator. They won't do the job satisfactorily. Three possible solutions:

1. Weathering. This costs only time and appearance, plus a wire-brushing job at 15¢ per square foot before painting. Allow the equip-

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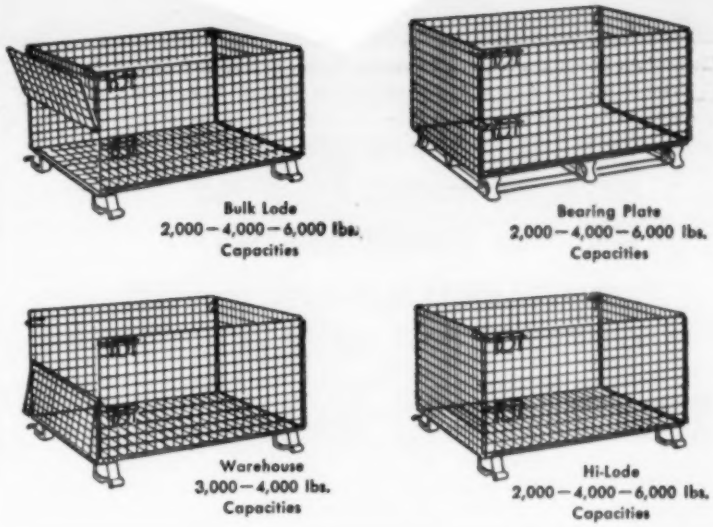

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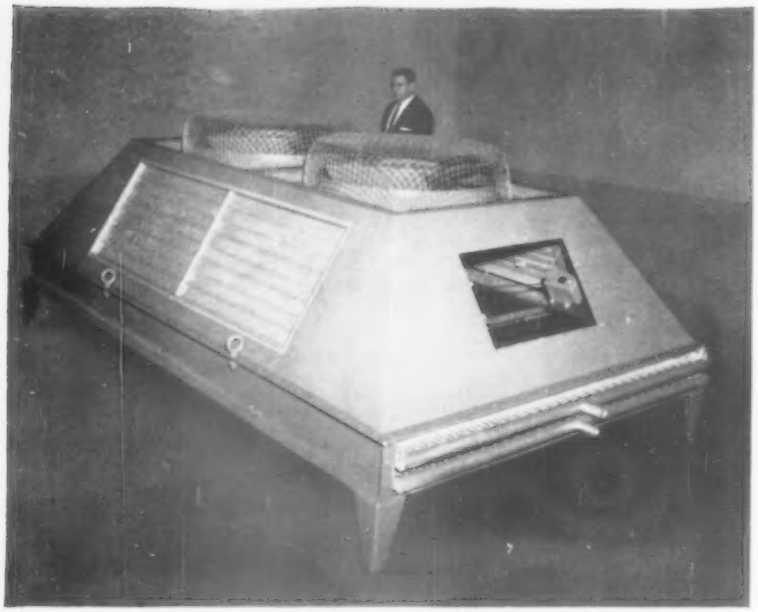

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4. **Compressor Stays on Line.** Horizontal discharge type units are easily affected by wind, even when deflectors are used. Under certain conditions effective air velocity over coil is so reduced that compressor cannot be kept on line.
5. **The "Buffalo" Control System Requires Considerably Less Refrigerant Charge** than "Flooded Coil Control". Result: Important savings on expensive Freon.
6. **"Buffalo" Units Provide Greater Evaporative Tonnage** (effective air conditioning load) than most other types.

"Buffalo" Air Cooled Condensers offer many other advantages which cannot be covered in this limited space. Your nearby "Buffalo" engineering representative will be glad to give you the full details. Phone him today, or write us direct.

"Buffalo" **BUFFALO FORGE COMPANY**

471 Broadway • Buffalo, N. Y.

Buffalo Pumps Division, Buffalo, N. Y. • Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

INDUSTRIAL EXHAUSTERS • BELTED VENT SETS • PROPELLER FANS • "E" BLOWERS-EXHAUSTERS

MILL-SCALE PAINT THIEF

Begins on page 140

ment or structure to weather until the mill scale has been entirely loosened by moisture and temperature changes. Time: up to two years.

2. Sandblasting. This should be done to sound "white metal" standards (clean, silvery surface). If you bring the work to the blaster in preassembly units (before erection), cost averages 12¢ per square foot. After erection it may run from 25¢ to $1, depending on how much clambering over the structure is needed. Apply first prime coat immediately after blasting.

3. Pickling. Unfortunately there are too few fabricating establishments that do this. A local galvanizer might handle small sizes. Cost, 6¢ per square foot.

Ideal answer to the mill-scale problem is removal at the source of manufacture. As someone has said: "The steel mills put the mill scale on, why shouldn't they take it off?" Fact is, you can buy descaled steel. But at a high premium—something like 50% of the ordinary cost. Perhaps if consumers make continued demands for quotations on descaled steel, they will convince steel producers there's a worthwhile market. Reasonable mill pickling costs should attract discriminating buyers and save them money on protection of surfaces.

Existing installations—What does the maintenance manager do in case of paint failure caused by mill scale? He has three choices:

1. Let it peel—let all the scale come off. Wait for the entire area to peel, and repair the surfaces in sections. The approach is similar to that of weathering.

2. Do it piecemeal. If the exposure is severe, it won't permit waiting. This requires a piecemeal repaint job with surface preparation by sandblasting. It's an expensive, time-consuming job that could have been prevented by initial removal of mill scale.

3. Paint for looks. If the problem is strictly one of appearance, then you should violate all good painting practice by throwing on a single coat of cheap paint. Reason for using cheap paint: It won't slow up the natural process of mill-scale weathering. **END**

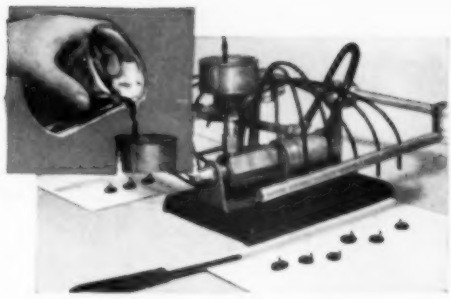
For more facts Circle 526 on Reader Service Card

For more facts Circle 527 on Reader Service Card ➤

Bertsch & Co. finds solution to lubrication problem...with Standard Oil's

RYKON Grease R

Centralized lube system pumps grease through 80 ft. lines in cold temperature; no clogging



Lab demonstration shows how RYKON Grease R works. Grease is poured into reservoir as a fluid. The shearing action exerted by pump and outlets irreversably converts fluid to a grease. Grease is ejected from outlet lines.

Problem: Bertsch & Company, Cambridge City, Indiana, makes pinch rolls and other metal bending equipment. A centralized lubrication system used on one pinch roll model had to pump grease 80 feet. Greases tried could not be pumped this distance without clogging lines. Since machines are shipped all over the world and are often in operation in cold climates, Bertsch had additional problems. The grease had to be pumpable in cold temperatures. It had to be foolproof so that customers beyond the reach of service calls would experience no problems.

What was done: Bertsch turned to Standard Oil for help. Standard Oil man, D. M. Simmons had the answer: Rykon Grease R. This is a rheopectic grease, one that flows like an oil. Its rheopectic properties cause it, under slight shearing stresses, to turn to a thick, durable grease. Rykon Grease R flows to the pump as a fluid, lubricates the bearings as a grease.

What you can do: Maybe you manufacture equipment that needs a centralized lubrication system and you have been looking for a grease like Rykon R. Get the facts about Rykon Grease R from your nearby Standard Oil lubrication specialist anywhere in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.**

You expect more from **STANDARD** *and you get it!*

Sons of founder, Harry E. and Robert O. Bertsch talk with Standard Oil lubrication specialist Donald M. Simmons. Don is well qualified to work with customers on difficult lubrication problems. He has the training and experience for it. Don graduated from Purdue. He has seven years service with Standard. He has completed the Standard Oil Sales Engineering School.

Smashing ¾ ton autos into 5 ft. bales

Century Electric motors provide reliable power to drive huge baling press

In a scrap salvage yard in Chicago, this huge press smashes autos into five-foot bales. Here's how it works: Stripped autos are dropped into a 20-foot press box. At the push of a button, three giant plungers move down with a force of over 1000 tons. Result: a compact bale, five feet long and two feet deep. About thirty cars an hour are run through this giant press.

Powering this machine requires sturdy motors. The press works on a two-minute duty cycle so the motors have to jump from practically no load to heavy overload in a split second. Five Century Electric 100 hp motors do the job. Result: plenty of dependable power when and where it's needed.

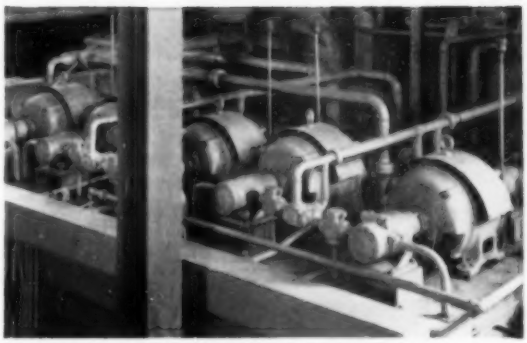
Solving motor drive problems like this is a day to day activity for Century Electric application engineers. They know motor drive problems inside and out because they sell and apply nothing but motors.

Here are some more reasons you're sure of getting the right motor for your equipment from Century Electric:

10,000 choices—Century Electric engineers don't have to rely on a few types of motors to do all jobs Century makes a complete variety of motors . . over 10,000 types from fractionals to 400 hp integrals. There is one for all types of equipment and for any kind of operating condition.

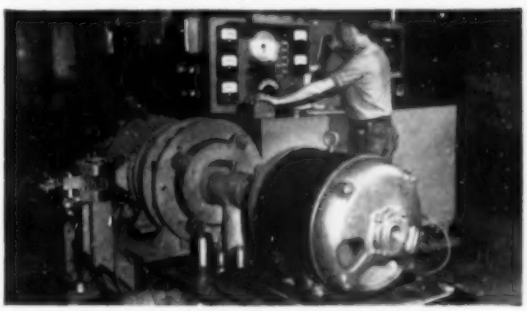
Long life motors—You get years of reliable operation from Century Electric motors. All are manufactured to rigid quality standards. Electrical tests and other checks made on operating characteristics assure you the best motor for your money. Long life is assured because: Tough insulation used in windings has great dielectric and mechanical strength, can withstand severe heat shocks as well as resist dust, dirt, acids . . rotors are precisely balanced to increase life and provide smooth, quiet operation . . rugged cast iron and steel frames can withstand tough abuse . . extra coats of insulation dipped and baked on add years to the life of Century motors.

For more information please contact your nearest Century Electric Sales Office or Authorized Distributor. For details on Century's complete line of motors write for bulletin 270A, Century Electric Motor Application Guide. For *more* than a motor . .



These five 100 hp Century Electric motors provide the muscle to drive the huge press.

From over 10,000 types of motors like these, Century Electric application engineers can select the best one for any job



Reliability is assured when motors have been subjected to factory tests more rigorous than those they will encounter on the job.

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

Auto is about to be dropped into press box. Note bales of compressed metal in foreground

Century 59-17

For more facts Circle 528 on Reader Service Card

How Management Men See Power Failure—What It Costs, How It Hurts, What to Do

- "Depending on when it occurs, electrical downtime may run from $85 to $750 per minute"—*West Coast aircraft plant.*
- "One 20⅔-hour shutdown cost us, exclusive of production costs, $37,000. Part of such loss is covered by insurance"—*Southeastern electrical manufacturer.*
- "When our vacuum pumps stop, we lose vacuum on many tubes. When that happens, it's a load for the junkheap. We can lose thousands of dollars on such an outage. Our emergency power cannot handle these pumps"—*Western electronic tube manufacturer.*
- "We make it our standard policy to stock breakers, insulators, cable, transformers, and standby equipment such as two-way switching to cut outage time caused by equipment failure."—*An electronics manufacturer in Texas.*
- "We stock some breakers, insulators, starter parts, etc. But we figure it's better to spend money on preventive maintenance than a high-cost inventory of spares"—*A Midwest pipe manufacturer.*
- "We stock only minor subassemblies—get anything else we need by air express from suppliers"—*An Illinois plastics manufacturer.*
- "During a power failure heat-treating furnaces have to be transferred to manual control. But the operators are usually reluctant to take the responsibility. So the maintenance department usually ends up doing it"—*Chicago appliance maker.*
- "We know a formalized outage procedure is essential because equipment will fail and people will fail. When an outage occurs, personnel must be so familiar with the procedure to be followed that it's second nature for them to take the prescribed course of action. There must be no milling around to discuss what to do"—*Southern electrical equipment plant.*
- "We found out during one outage that we didn't have enough emergency lighting. So we installed big spotlights on all our fork-lift trucks"—*California controls manufacturer.*
- "Every plant ought to know how much notice it needs if the utility is faced with an unavoidable power shutdown. It also ought to know what loads can be dropped temporarily during an emergency"—*A utility spokesman.*
- "We keep a sharp eye out for little indications that might lead us to big trouble spots. We traced one outage to a faulty stress cone. Rather than merely correct this one fault, we checked the man who made it and found that he had made 68 other cones. So we checked each one and found that 30 were defective and could have very well led to additional outages"—*A Georgia electrical manufacturer.*
- One of our hardest causes of outages to control is that of cranes from outside contractors hitting our in-plant power lines"—*A Midwest welding plant.*

What to Do

At a cost of up to $750 a minute, you'd better act fast. Here's how to minimize outage problems, get power back fast, keep employees busy and useful.

POWER FAILURES come in different lengths, widths, and colors. They stretch from a few seconds to a few days. They range from department-wide to plant-wide. Their colors run from dark gray to very, very black. Everybody loses when they occur—plant management loses, employees and customers lose, and the utility loses.

Are plant-wide outages common? You bet they are. FACTORY's 1958 Electrical Management Practices Survey (August 1958, page 52) showed that out of 293 plants reporting on plant-wide outages, 34% had one or two outages, 21% had three to five, 10% had six to ten, and 5% had more than 10 during the previous two years. Only 30% reported they had none. Analyzing the outages, 55% were found to have resulted from failures somewhere on the utility system. And 28% originated in the plant's own primary substations or main feeders.

Old-plant vs. new-plant outages? If your plant is less than five years old you're more likely (by a factor of 1.6 to 1) to have had a failure than your neighbor whose plant predates World War II. This is one of the penalties that industry has to pay for moving to rural locations, where power lines are more exposed to damage. Given time, utilities will firm up these weak spots in their systems.

Do outages cost money? They sure do. Downtime costs may run as

When Your Power Fails

high as $750 or more per minute. And many plants, according to FACTORY's 1958 survey, are not well equipped to cope with failures.

But national averages on power outages are of little interest to a plant that never has a failure. And they're not very helpful to one that never knows whether the next lightning storm will shut down the power. What really counts is how much trouble *you* have with outages—and how they may affect *your plant* in the future.

This is why FACTORY recently asked McGraw-Hill News Bureaus to check 25 typical well-run plants across the country. These 25 plants had reported outages in the 1958 survey. None of them had any substantial power generating equipment of their own. And most of them had only one feeder from the utility. Our news bureaus asked them how they minimize their problems, what they do to get back on the line quickly, how they handle employees during outages. You'll find their answers below—answers that may help you next time you have a power failure in your plant.

THREE STEPS TO SUCCESS

The right way to go after power outages is a three-step operation:

- Analyze the cost of downtime.
- Prevent those outages that you can avoid.
- Plan to reduce the magnitude of those outages you can't avoid.

There's an added bonus in planning: Much of the problem covers the same ground as disaster planning. So you'll be licking part of your disaster problem at the same time, if you study how to make the best use of all the manpower available during power outages.

Needed: records—You can size up the importance of the outage problem easily—if you keep the right records. A lot of plants—even big ones—don't keep power records. On the other hand, some companies have a special place on the daily departmental production report to indicate any power outages—even those of less than a second. That way it's a quick job for a clerk to make routine checks to catch changes in power flow continuity from one quarter to the next. The electrical maintenance department daily report should also include all outages.

The cost of downtime in your plant will determine whether the problem is worth further study. One reminder: Short-run historical records on outages may be deceiving, especially if they are plant-wide outages. They may look worse on record than your long-run average will be if you have a new plant (where weaknesses due to faulty new equipment and workmanship will show up) or if you've been through a few years of really rough weather.

Yet you mustn't forget that as the electrical equipment in your plant begins to climb beyond the 20-year-old mark, failures from age and obsolescence will creep in. And that tornadoes, floods, hurricanes, and lightning can (and do) strike twice and more in the same place, even after long forbearance.

You can't afford many minutes a year without power, especially if any outages are easily preventable. Take the case of those originating outside the plant first.

IF THE UTILITY FAILS

How can you eliminate utility-caused outages? Same way you make sure of getting rich—pick wealthy parents. In other words, pick a utility that doesn't have failures.

But it's not that simple. Suppose you're in an outlying area where wind, ice, lightning, and auto crashes plunge your plant into darkness occasionally. You may have to make the best of it—hope for the day when the utility can justify more expensive and better-protected line construction to your plant.

There are solutions, of course:

1. Bring a second feeder to your main substation. It may give you almost interruption-free service.

2. Ask the utility for high-voltage underground service. You may get it if you're a good customer—or if you intend to convert big loads from gas or other fuels to electricity—or if you have several industrial neighbors—or if storms cost the utility a lot of trouble. (Some utilities prefer to serve industrials underground.)

3. Install emergency generators to handle critical lighting and production loads. Newer automatically controlled and regulated emergency units take little space. They're simple, easy to install, dependable; need little maintenance. You can buy units that pick up full load in a few cycles (if pick-up time of a few seconds is a problem).

4. Minimize the losses that do occur. This is your only recourse if you can't justify the expense of alternate utility feeders or of generating your own power.

IF PLANT SYSTEM FAILS

Much of this problem is under your control. You can do something about it. You can replace inadequate equipment. Or you can improve preventive maintenance so you'll catch trouble before it occurs. Or you can install alternate primary distribution equipment (for example, a double-ended primary substation) to maintain service even during equipment failures.

Many plants, though, may not need—and can't afford—100% guaranteed interruption-free service. What then?

Turn the page

There's a big difference in

PAYLOADER® Performance

BIG LOAD CAPACITY—The model H-25 PAYLOADER tractor-shovel has a carry capacity of 2,500 lbs.—carries more for its weight than any machine in its class.

MORE DIGGING POWER — Breakout force of 4,500 lbs. is available at the bucket cutting edge — more than on any other machine in its class. Exclusive power-transfer differential makes traction and "crowding" power more positive, especially in slippery conditions.

MORE MANEUVERABLE — Shortest turning radius (only 6 ft. at rear wheel hub) and power-steer make it possible to operate in closer quarters with greater speed and safety.

POWER-SHIFT TRANSMISSION — The model H-25 is the only machine in its class having a full-reversing power-shift transmission with two speed ranges forward *and* reverse — the low ranges for digging and close maneuvering, the high ranges for fast, economical travel. No "clutching" or gear-shifting.

LOWER MAINTENANCE — The boom and bucket mechanism is of rugged, simple design with fewer parts and linkages. Quality materials are used throughout, including anti-friction bearings at critical pivots.

LONGER LIFE — The most complete system of protection has been engineered into the Model H-25 to insure long life and freedom from trouble: triple air cleaning system for the engine; cartridge type filters for all three oil systems; self-adjusting, sealed hydraulic brakes; closed pressure-controlled hydraulic system; grease and oil seals on all vital pivots.

Your Hough Distributor is another reason why you'll get lower-cost bulk material handling from a PAYLOADER. He is ready to give you full information on the H-25, or larger models up to 12,000 lb. carry capacity.

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WHEN POWER FAILS

Begins on page 152

The sensible alternative here is to reduce the dimensions and cost of those interruptions that you consider inevitable. How? By planning. Here's where you may be able to improve plant operations without spending anything but a few hours.

MAKING YOUR PLANS

Who does what?—This is the starting point for any emergency planning. If you already have a disaster plan, much of it will be helpful in a power outage.

First, make sure your people understand the responsibilities of notifying electrical maintenance supervision. Is there an alternate lectrical supervisor always available when the regular supervisor is out of the plant? Remember, in a widely scattered plant, production people can't determine whether power is off everywhere or only locally. Unnecessary calls to the maintenance department only tie up a phone that may be badly needed. Good planning is essential here to cut duplication of phone calls.

Many plants in FACTORY's survey reported that all or part of the electrical maintenance crew are instructed to phone or report to maintenance headquarters to see if they are needed. Others report to prearranged departments, where they take over shutdown (and eventual starting) of loads that pose special problems. This way, electrical maintenance knows where they can be reached by phone if they're needed.

Who deals with the utility?—When power failure occurs in the utility lines it's useless for half-a-dozen plant supervisors to phone various people in the the utility. Power companies are usually well organized to handle emergencies. Some of them designate one man (or his alternate) to be called. If you don't think this one man can speak with authority on the timing of power restoration, explain your reasons to the utility management *before* a serious outage occurs. Don't wait until everyone at the utility is swamped with the problems of getting the lines repaired. Keep calls to this key man limited to the people in your plant

Turn to page 158

For more facts Circle 529 on Reader Service Card

For more facts Circle 530 on Reader Service Card ➤

another G-E PROJECT '8000' development

GENERAL ELECTRIC ANNOUNCES . . .

New Custom '8000'* Motors

PROJECT '8000' . . . a major General Electric program of research, redesign, advanced manufacturing and improved customer service on A-c motors 150 to 6000-hp.

*Trademark of General Electric Co.

CUSTOM DESIGNED . . . New General Electric Custom '8000' motors are built specifically to meet your requirements. Selecting from specially designed enclosures, advanced insulation systems, custom-designed end shield and bearing constructions, and more than 15 custom-designed accessories—plus a countless number of electrical designs—General Electric engineers will create a motor to meet exacting needs, provide initial and continuing economy, and give long, reliable service. Turn page for features of new Custom '8000' motors.

NEW CUSTOM '8000' MOTORS GIVE TOP PERFORMANCE WITH LESS MAINTENANCE . . . HERE'S WHY

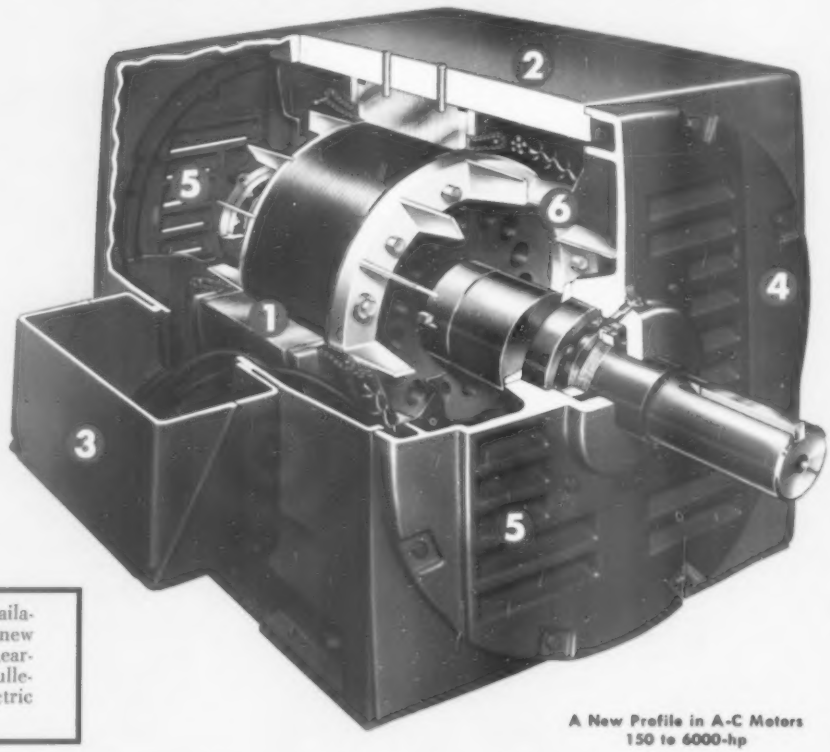
GENERAL ELECTRIC

FROM GENERAL ELECTRIC . . .

another G-E PROJECT '8000' development

NEW Custom '8000'* Motors Give Greater Reliability Require Less Maintenance

1. **LONGER INSULATION LIFE**—Pre-wound core allows closer quality control and gives longer insulation life through improved varnish impregnation or silicone rubber encapsulation.
2. **BETTER CONSTRUCTION**—Cast iron frame withstands 20G simulated transportation shock tests; resists corrosion.
3. **FASTER INSTALLATION**—Conduit box has up to 3 times volume of ordinary boxes; lifting lugs, cast to frame, hold up to 12 times motor weight.
4. **EASIER MAINTENANCE**—Flat end shields are more adaptable to addition of accessories or modifications; are lighter—easily handled by one or two men.
5. **BETTER COOLING**—Double-end ventilation, new duct design and louvred air openings provide more efficient air distribution through motor, reduce hot spots.
6. **LOWER NOISE LEVEL**—Sound power has been cut up to 50% by redesigning frame sections, rotor fans, air deflectors and intakes.



A New Profile in A-C Motors
150 to 6000-hp

FOR COMPLETE INFORMATION and availability dates about General Electric's new Custom '8000' motor line, contact your nearby Apparatus Sales Office, or write for bulletin GEA-6865, Section 884-2, General Electric Co., Schenectady, N. Y.

NEW Polyseal* SILICONE RUBBER INSULATION SYSTEM IS AVAILABLE ON CUSTOM '8000' MOTORS

Silicone rubber used in Polyseal insulation systems is a product of General Electric's Silicone Products Dept., Waterford, N. Y. . . . a leader in research, development, and manufacture of silicone materials. Supported silicone tape is a development of General Electric's Insulating Materials Dept., Schenectady, N. Y. Combining silicone rubber with dacron-glass supporting materials is a major engineering advancement, giving this material both the mechanical and dielectric strength required for use as a motor insulation. Polyseal insulation systems are available *only* on General Electric motors. Medium AC Motor & Generator Dept.

FORM-WOUND MOTORS

Polyseal supported silicone rubber insulation system provides greater mechanical, thermal, voltage and environmental endurance than unsupported silicone rubber. Glass fabric materials are imbedded in each layer of silicone tape, which, after coil wrapping is vulcanized under heat and pressure to seal the system against moisture and contaminants. General Electric form-wound open motors with Polyseal insulation system can be used in some severe atmospheres formerly reserved for totally-enclosed motors.

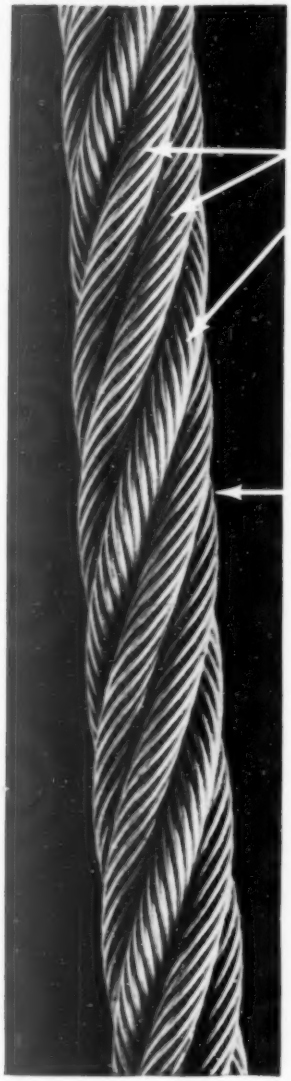
RANDOM-WOUND MOTORS

Polyseal silicone insulation system offers greater flexibility and better heat transfer than existing encapsulations . . . it operates effectively from —90C to 200C and will not crack under excess thermal cycling or severe moisture. After receiving G.E.'s standard random-wound insulation treatments, Polyseal insulation is applied to stator and end turns, completely sealing windings with a thin, waterproof, inert covering which protects against extreme moisture, most chemical fumes, dust and corrosion.

*Trademark of General Electric Co.

Progress Is Our Most Important Product

GENERAL ELECTRIC



Herringbone's two pairs of Lang lay strands and one pair of regular lay strands provide the ideal combination of maximum flexibility with good stability.

Finer wires inside contribute to Herringbone's excellent drum-winding characteristics.

Heavier outside wires in each strand have greater resistance to abrasion.

"...and it has a much longer life"

GASKILL CONSTRUCTION COMPANY

The above quote is one of the things that Gaskill Construction Company says about the new Roebling Herringbone* Wire Rope. There are further quotes: ". . . We, after giving your Herringbone cable a great deal of use, find that it is far superior to any other cable and it is much more economical."

These are *user* statements about the newest design development in wire rope in many years. Herringbone is the regular lay and Lang lay wire rope. It is two-ropes-in-one rope, with the best features of each in combination. It has been used, with the same success quoted here, on a wide variety of machines as well as on tough hoisting jobs. Its potential is virtually unlimited wherever all-steel ropes are specified and on most installations where fiber core ropes are standard.

Your Roebling Distributor has full details on Herringbone, or contact Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

*Reg. App. For

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

For more facts Circle 531 on Reader Service Card

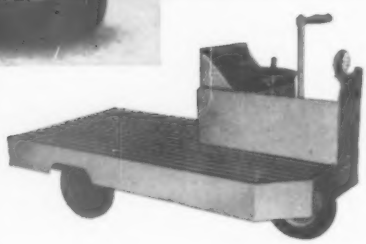
NEW TRANSPORTER IN TWO SIZES

1000 lb. & 4000 lb. CAPACITIES

MODEL F-40 Torque converter drive. No shifting, smooth starts. This is a big rugged 4000 lb. capacity unit that delivers heavy duty service as a freight carrier, shuttle truck, long stock transporter, and to give mobility to equipment and personnel. 28 sq. ft. deck area.

PRIME-MOVER

Prime-Mover transporters are marketed by industrial truck distributors. Ask there -or write: Prime-Mover Co., Muscatine, Iowa.

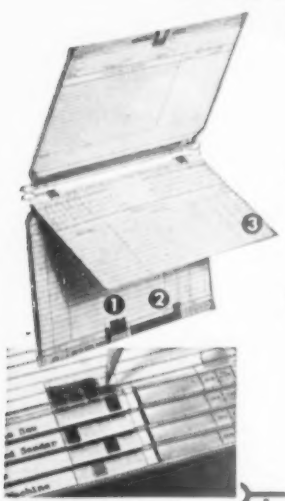


MODEL F-10 A 1000 lb. capacity truck. Carries cartons, long stock, mixed freight, maintenance supplies, baggage, fire equipment. Ideal for foremen, superintendents, inspectors, supervisors. 18 sq. ft. deck area. Wisconsin engine. Industrial type combination transmission. Price: $880 manual start; $996 electric start. F.O.B. Muscatine, Iowa.

For more facts Circle 532 on Reader Service Card

ACME VISIBLE

Preventive Maintenance Record Systems CUT "DOWN" TIME



1. **ONCE A WEEK** Lock-in chain signals, with 4 windows, each a different color, show the week inspection is to be made. With both month and week signalled, you avoid missing semi-monthly inspections or those requiring more frequent attention.
2. **ONCE A MONTH** Progressive signals, always visible, show the inspection schedule. Colors designate type of work to be done. When work is completed and entered on record card, signal is advanced to month next inspection is due.
3. Acme hinged pockets and the two cards on one hanger feature, is ideal for follow-up control. Each machine and motor is listed on an individual card placed in the back of pocket—in facing pocket a "History of Repairs," with signals *always visible*, indicate next inspection or lubrication date—"Spare Part in Stock" record card is hung on the same hanger as "History of Repairs" card.

ACME VISIBLE RECORDS, INC.
CROZET, VIRGINIA

District Offices and Representatives in Principal Cities

ACME VISIBLE RECORDS, INC. CROZET, VIRGINIA
FM-859

☐ Send us more information and literature on Preventive Maintenance.

Company ..... Attention .....

Address .....

City ..... Zone ..... State .....

For more facts Circle 533 on Reader Service Card

Begins on page 152

who need to deal with him. This is seldom a job for production supervisory people.

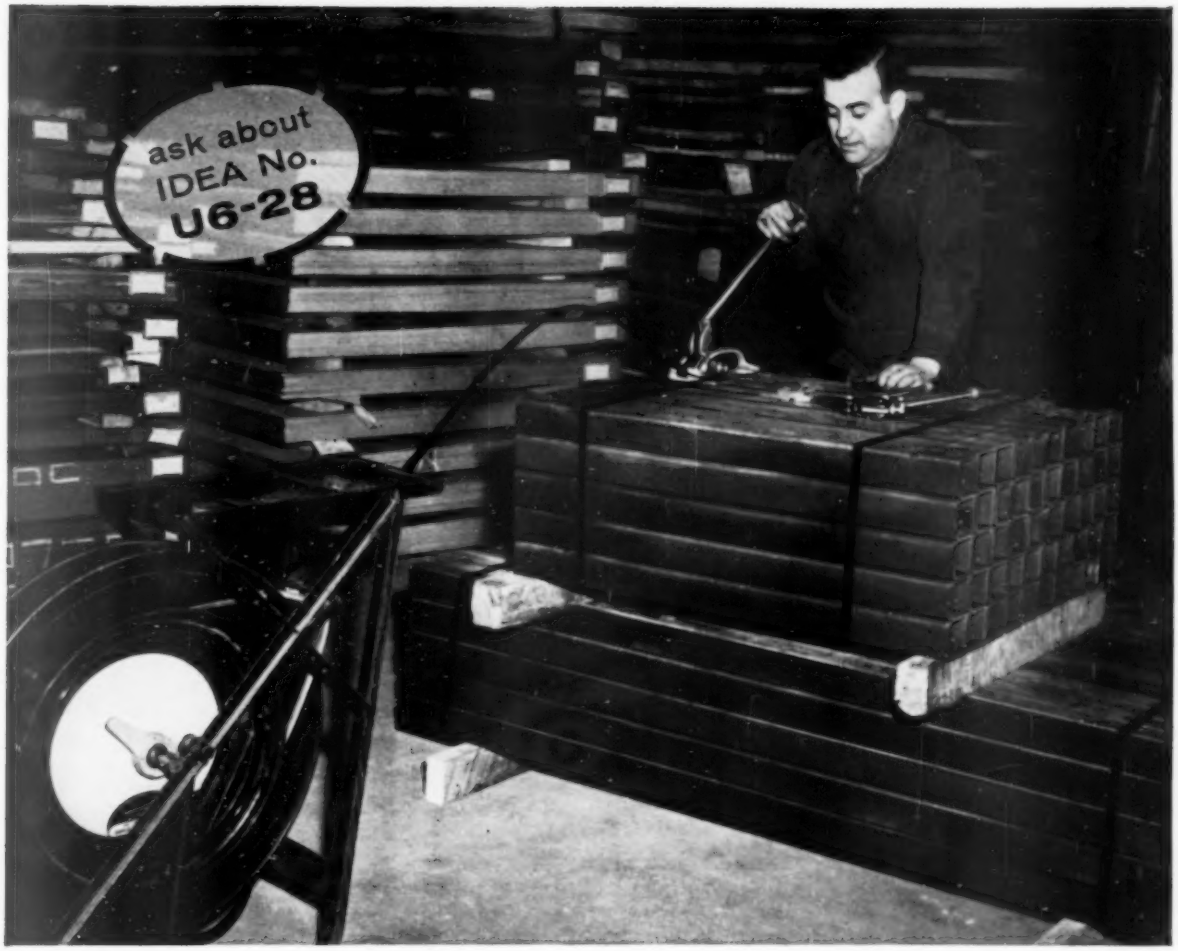
For instance, in one large Texas company only the following men contact the utility: maintenance engineer, plant engineer, layout and facilities supervisor, manager of services, and division vice president. Most of the plants surveyed feel that their utility gives them all the available facts when there is power trouble. One West Coast plant reports it has some "back room" phone numbers for reaching power company engineers when the utility's switchboard is tied up. A Wisconsin paper mill deals with the utility through the front-gate watchman. When phone communication is tied up he goes through the local fire department, which has a direct line into the utility switchboard.

One word here from a utility spokesman. Don't try to force your utility to give you preferential treatment on power restoration over your neighbors. Your request is bound to backfire eventually. Utility repair crews work around the clock when there's trouble. They're far more likely to go out of their way for a friend than for someone who threatens reprisals through political or business connections.

It doesn't make much sense to point out to your utility that uninterrupted power is essential in your plant if you have nothing but a straight radial distribution system with no alternate channels for power to those "uninterruptible" loads. On the other hand, if you face losses when power is off beyond a certain length of time, be sure your representative in the utility really understands the seriousness of your problem. And don't wait until the lines are down before you tell him.

What does your maintenance staff do?—Non-electrical maintenance personnel ought to know, too, just what you expect of them when power fails. If some have skills that might be useful in restoring power, don't overlook them.

A few of the plants surveyed have thought out their outage plans so well that as soon as word comes that power will be off for a substantial time, maintenance crews are ready to



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Bundling Idea protects formed channels

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NATIONAL METAL FABRICATORS, CHICAGO, ILLINOIS, sought a way to package formed channels so that bundles would stay intact, despite severe handling. Their Acme Idea Man recommended bundling them with Acme Steel Strapping. (Idea U6-28)

Bundles remain intact and channels arrived on the job damage-free. Bundles of 50 to 100 channels give increased efficiency in handling and shipping operations. Inventory control is simplified and storage space is more efficiently utilized.

***Work with your Acme Idea Man.** With his help you may be able to find a more profitable shipping and materials handling method. Call him at your nearest Acme Steel Office. Or write Dept. FAU-89, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

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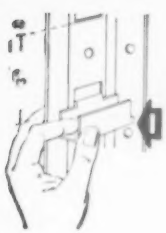

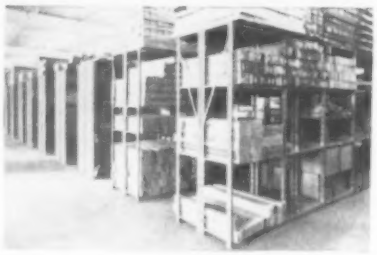

Insert 4 shelf support brackets . . . no fumbling with studs, bolts, nuts or lock washers. **and then** **Tilt shelf into support brackets** . . . and shelf is ready for loading.

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A SUBSIDIARY OF THE AMERICAN METAL PRODUCTS COMPANY OF DETROIT

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Begins on page 152

make the best of the bad situation. They inspect and repair production equipment that normally runs 24 hours a day. Replacement parts like bearings, seals, and insulation are always on hand, and maintenance foremen waste no time getting their crews started. Non-electrical maintenance staffs may be your best bet to handle critical production equipment shutdown problems.

What do production people do?— They're often your biggest problem. The combination of inadequate lighting (and often ventilation), ruined bonus-rate plans, nothing to do, and the usual quotas of high-strung, wise-cracking employees is often enough to keep production supervisors busier than ever during an outage. But think over the troubles that occurred or could occur during outages that are too short to send employees home but last too long to let them stand around idle. Most of these troubles are preventable if you plan for them.

Here are some of the good ideas from the survey:

- Know what you're going to do. One plant has all its future repair work logged on cards. When power is down the foreman shuffles through the cards and picks out those jobs that can be handled in the time that's available. Some production supervisors keep a list of manual or clean-up jobs handy. Here are a few samples: clean, wipe down, or paint machinery; sweep up; clean out lockers, toolboxes, workbench tops, and drawers; scrape down paint accumulations in painting areas; clean and straighten up fence lines and outside storage areas; repaint aisle lines and roadway limits.
- If you have to keep employees busy, assign them to jobs where instruction and supervision problems are at a minimum. And have the necessary tools on hand.
- Emergencies are an excellent time to check the capabilities of employees at all levels, one plant points out. Production employees with supervisory promise often show their competence in crises. Final reports to top management ought to include such notations.

What happens to hourly pay?— One-third of the plants surveyed

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WHEN POWER FAILS

Begins on page 152

guarantee a minimum of four hours' pay if an employee reports for work. Another third report that the workers are dismissed and paid only for work done up to their dismissal. Two plants, both in the chemical industries, said they have more work for their operating people than they can handle during emergencies. One non-unionized plant pays an employee for a full day's work unless he's notified not to come to work two hours before starting time.

One big CIO-unionized plant has a contract that considers a major power failure an emergency. The men can be dismissed and paid only for the time worked (but partial outages call for a four-hour minimum pay). Three plants have no fixed policy—they decide whether to pay employees as each problem occurs. The remainder have policies that guarantee employees either one or two hours of work. No one reported that company policies on this problem have changed significantly in the last several years.

What happens to production?—Biggest headache in many plants is to avoid damage to work in process and to production equipment like machine tools, furnaces, kilns. Where skilled operators are available and labor turnover is slow, the shutdown and protection job may best be handled by the operators themselves. But they need to know what's expected of them ahead of time. Some of the regular foremen are bound to be on vacation or sick when that next serious outage occurs.

If it has been very long since your last outage, it's high time you checked on the effect of an extended period without power on a department-by-department basis, making sure central utility services (air compressors, water pumps, boiler room, sewage system, cooling towers) are not forgotten. The same applies to office services. Lots of plants have found to their dismay that when the feeder line supplying a ventilator system goes down, heat builds up, employees can't work, and other equipment has to be shut down because of dangerous overheating. The way to avoid this is to unitize production processes so that failure of the power to one production-unit

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WHEN POWER FAILS
Begins on page 152

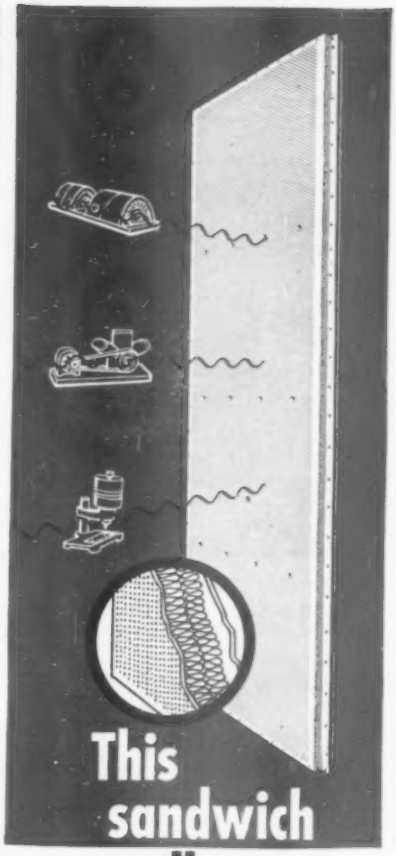
auxiliary will not jeopardize an entire plant.

Some plants are frank to admit that damage to work in process during an extended outage could run into many thousands of dollars—in addition to labor and overhead expenses. One such failure might cost as much as minimum emergency generating equipment. For instance, a typical 125-kva. emergency LP-gas driven generator with manual transfer switching costs about $10,000 installed. This will handle 80 hp. of motor loads (if manual restarting of motors is staggered) and plenty of emergency lighting.

No plan to reduce the dimensions of outages will work unless management has an intelligent estimate as quickly as possible of the duration of the outage. Responsibility for the estimate should fall on one man or one team of experienced employees. The estimate should be given to production management, who will pass it on to various supervisory levels. This eliminates anything but urgent calls to maintenance people during an emergency and makes sure everyone in the plant is acting on the best information available from the start.

What about lighting?—Emergency lighting is a "must." Fortunately, good battery-supplied, automatically operated floodlighting units are now available at reasonable cost. Most new plants have them. (But many older industries still depend on flashlights and whatever daylight is available.) It takes the loss of only a few minutes of an employee's time to pay the cost of these post-mounted units. Maintenance costs are insignificant. And the assurance that no employee can be hurt moving about in (or leaving) a dark plant may be well worth the cost.

What can you learn?—Something from every outage. It's surprising what good ideas come out when you ask employees and supervisory people for suggested improvements in handling outages. Maintenance staffs may have some ideas well worth considering, too. And when the failure originates in the plant distribution equipment, make sure that all steps are taken to prevent any recurrence of the trouble. **END**



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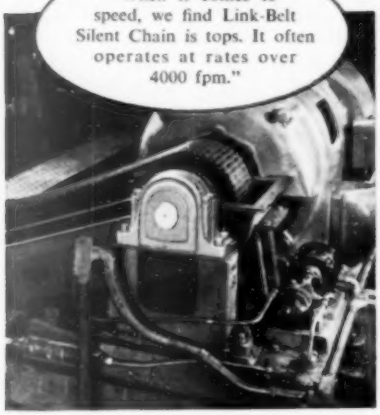

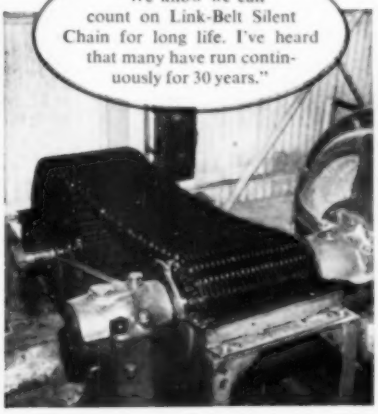

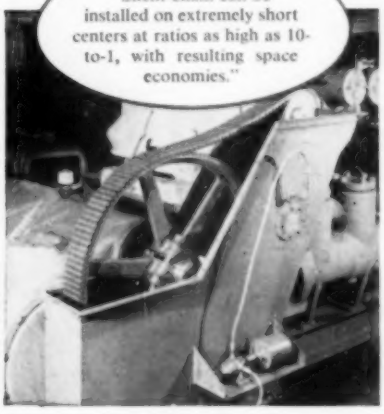

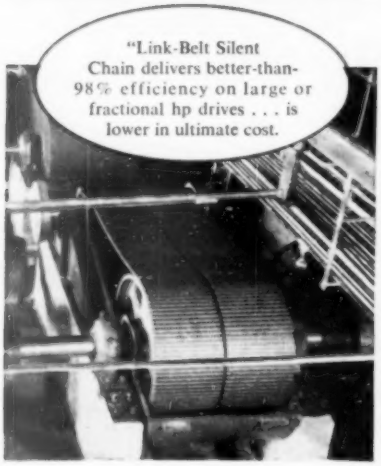

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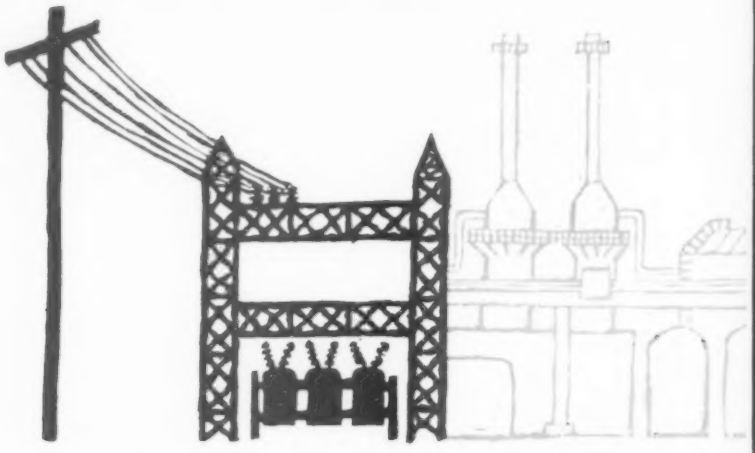

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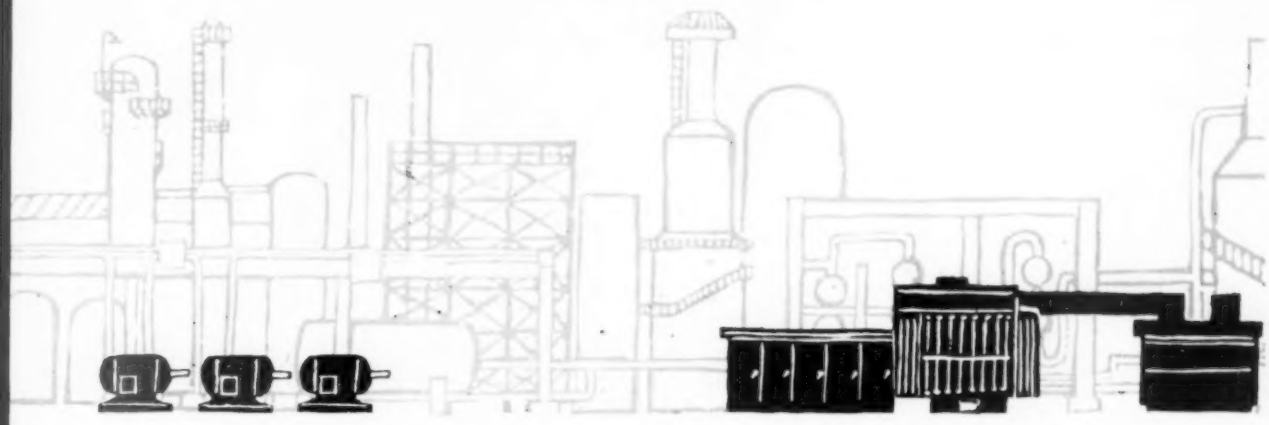
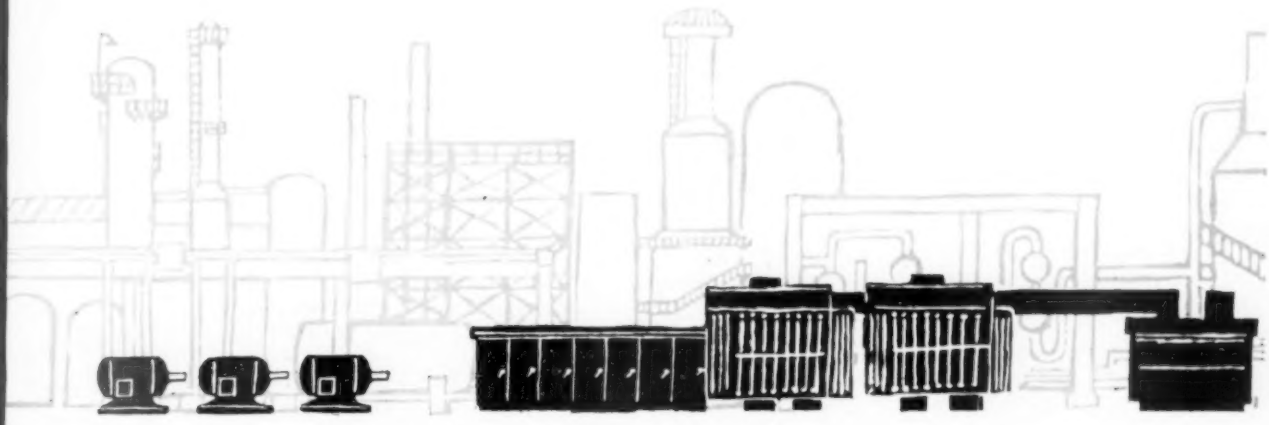
Result: increased production,

ELECTRICALLY



and expanded their Houston refinery



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1. Hire better.

Everything from paper clips to diamonds (including money) is fair game for the plant thief. He's costing you plenty—even if you don't know it. Here are six case histories (with morals) and . . .

Three Rules to Help You Stop

THE OFFICE of the plant protection chief was hot. So were the chief, the production manager, and the personnel manager. Coolest one in the room was the toolroom foreman. He was the only one not talking.

All the men knew the foreman had been stealing tools. But only the foreman knew how many. Fact was, he had enough equipment in his garage workshop to start in business for himself. And most of it had come from the company.

He'd been caught red-handed that morning by a fluke. The production manager had been up to the toolroom to check on a job. The foreman's jacket had fallen off its hanger when one of the toolmakers slammed the door. The carbide inserts (about $20 worth) had fallen out of the pocket, where the foreman had put them just a few hours earlier.

Now they were trying to get the foreman to talk. But he wasn't obliging. He knew the $20 wasn't enough to cause the company to bring charges. He'd seen too many men caught in the act before. And he knew the other tools in his home workshop weren't a problem to him. They weren't marked. Nobody could prove he hadn't bought them.

He had a perfect record at the company. He knew the worst that could happen would be a discharge. And, if fired, he knew exactly what he'd do the next day. He'd start in business for himself, in his well-stocked garage workshop.

By JOHN A. KING, Special Auditor
Liberty Mutual Insurance Company
Boston, Mass.

HOW THEFT HITS YOU

The scene in the chief's office is repeated often in manufacturing plants. Trusted employees steal everything from paper clips to diamonds. And many's the manager who has no control over plant theft, even when he suspects it's going on.

Fact is, crime is on the rise across the nation. Theft, larceny, and burglary share in the upsurge. They hit you. They cost you money. They add to the cost of doing business—and ultimately to the cost of your product. If direct losses don't sink a company, loss of a competitive pricing position could.

Most losses occur in cash, checks, or inventory. Because money losses have an exact value, they are fairly easy to detect. But inventory losses often remain undetected for years. What can be done to prevent or reduce inventory thefts by employees? Several things. First step is to determine the causes.

An analysis of losses paid by insurance companies reveals these three main plant weaknesses:

- Poor hiring practices.
- Poor plant safeguards.
- Lack of records.

Here at Liberty Mutual we don't know the exact amount of annual losses through fraud in all its various forms, because much loss is never discovered. Yet there have been innumerable cases where the first fraud to be uncovered was big enough to destroy the company.

Let's treat the three causes separately to find out what measures you can take to prevent inventory thefts (in the plant and outside).

1. HIRE BETTER

In crime prevention, the first line of defense is careful selection of personnel. Each applicant should complete an employment application form. The form should require a chronological listing of all previous

2. Set up safeguards.

3. Keep records.

Thieves in Your Plant

employers with each period of employment. It should provide space for listing references, both business and personal. You should also ask the applicant questions about his previous bonding history. For example: "Have you ever been bonded? If so, by what company?" "Is there anything in your past record to prevent your being bonded?" The applicant should give a satisfactory explanation for any gap in his employment history. You should investigate references promptly and evaluate business references with special care.

Give special attention to the applicant's answers to questions about his previous bonding experience. A comprehensive employment application form that includes such questions will be a psychological deterrent to weak-willed applicants. Also it will usually cause those with questionable backgrounds to withdraw.

If your company carries a crime policy that includes "Dishonesty of Employees" coverage, you should require each prospective employee who is to occupy a position of trust to complete a bonding questionnaire. The form should be prepared in duplicate to provide a copy for the applicant's personnel file. Original should be forwarded to your bonding company for investigation. Bonding companies have special facilities at their disposal, including voluminous data on known defaulters. Often they uncover information that has been withheld from employers.

You should also require bonding questionnaires from employees whom you're considering for promotion to positions of greater trust.

2. SET UP SAFEGUARDS

Micrometers, gages, industrial diamonds, electronic parts and tubes, automotive parts and accessories are only a few of many items that plant thieves can convert to cash

Every manager, as part of his regular duties should make occasional unannounced trips to material- and tool-storage areas. Here's a 16-point checklist to help you maintain adequate control over inventories:

1. Raw materials, supplies, and finished goods should be stored in areas that are separated by solid, heavy wire partitions extending to ceiling height. These areas should be under the control of storekeepers, with access restricted to employees whose work requires it.

2. Doors to buildings and inventory areas should have sturdy bolt locks. Hinges should be concealed. Doors to stockrooms that contain valuable materials should have time-recording locks.

3. Windows at street-level or windows accessible from adjacent roofs should be protected with bars or heavy wire mesh (if fire rules permit).

4. Management should keep a record of keys to locks securing important areas. It should include employees' signatures on receipts of keys. Periodic check times should be flexible and key record changed each time keys are reported missing or key custodians change.

5. Employees should leave the premises only through designated exits under observation of guards or watchmen. Guards should make periodic, unannounced examinations of employees' packages and lunchboxes. There should be a firm agreement with employees and union representatives that any theft of company property constitutes cause for immediate dismissal. This is a strong deterrent to pilferage.

Turn the page

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CM HOISTS

THIEVES IN YOUR PLANT

Begins on page 168

6. There should be a definite policy for employee purchases. Merchandise should be sold to employees only at specific times and through authorized personnel.

7. There should be a policy on lending tools and selling "seconds" to employees at a low price.

8. Employee purchases should be wrapped, sealed, and released to the employee only upon receipt of a prenumbered sales invoice or sales ticket, a copy of which should be forwarded to the accounting department for audit and control.

9. Night watchmen should make periodic rounds of all buildings and yard areas. Their rounds should vary to avoid creating a predictable pattern. Contacts should be made with an outside protective agency at regular intervals.

10. Guards and watchmen should get written instructions outlining their duties and defining the following: frequency of inspection tours; areas to be covered; passing of employees and visitors—who gets in and when; recording of after-hour admittances and departures; conduct in event of emergency; routine for apprehension of suspects. Capable, aggressive, well-trained guards, carefully supervised, alerted to their importance, and held responsible for faithful performance, will help prevent inventory losses.

11. If you employ no guards or watchmen, all areas that might attract thieves should be wired to an outside protective agency. There are several protective systems available, depending on the location of the plant and the value of the inventory to be protected. In most areas you can choose among wired alarm systems, invisible ray alarms, electronic alarms, and ultrasonic alarms. In addition to safeguarding inventory, properly installed systems with an Underwriters Laboratory Certificate can reduce the burglary insurance premium.

12. Toolcribs should be locked or kept under the supervision of a storekeeper. Access should be forbidden to all but authorized personnel. Continued replacement of "lost" or "missing" tools is a warning that you need prompt investigation.

Turn the page

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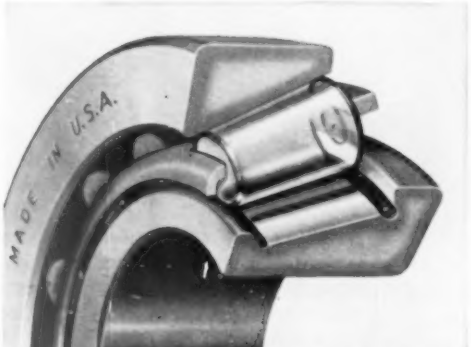
HONING PROCESS mows down microscopic imperfections still left on bearing raceways *after* final grinding.

Bower mows down sub-miniature "mountains" to fight wear, stretch roller-bearing life



Bower Tapered Roller Bearings are *Spher-O-Honed:* 1. Roller heads are spherically contour-ground, need no "run-in"; 2. Oil groove is bigger for positive roller-head lubrication; 3. Honing superfinishes inner and outer races for longer life.

Bower hones bearings to reduce friction, save you money on machine downtime and replacement costs

Finish grinding of bearing raceways still leaves minute surface blemishes—"mountains" under magnification. So Bower takes a costly extra step . . . uses a honing process to smooth off these microscopic mountains.

Super-finished raceways offer less resistance to rollers. This reduced friction naturally results in less wear and longer life. Bower tapered roller bearings need no initial "run-in". You get more production time from your machines . . . save on bearings and, more important, the costly labor it takes to replace them.

Your Bower bearing specialist can give you fast delivery on his complete line of tapered and straight roller bearings. Call him when you need replacements!

BOWER ROLLER BEARINGS

FEDERAL-MOGUL SERVICE

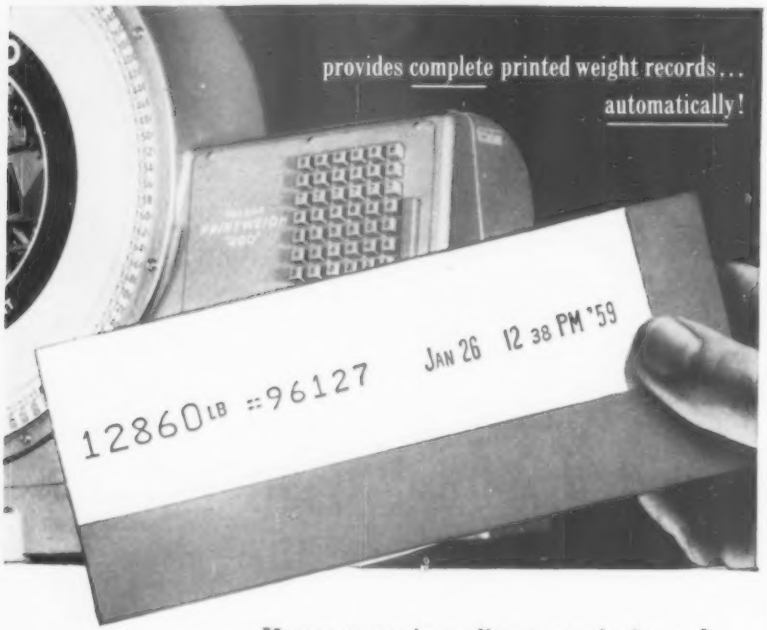
DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

BEARING BOWER ROLLER BEARINGS SERVICE

For more facts Circle 545 on Reader Service Card

BAN this "birthplace of losses"
... hand-written weight records!

NEW TOLEDO
PRINTWEIGH® "400"



Human errors in reading, remembering and recording weights *are eliminated* with new Toledo Printweigh "400" . . . product of Toledo's advanced research and development programs to improve weighing efficiency.

Printweigh "400" provides *complete* printed weight records on materials received, processed, transferred or shipped. It's applicable to the full range of Toledo dial scales . . . offers a wide choice of optional features, including a "memory" for printing weight data even after the load is removed.

Printweigh "400" prints full figures, even when using unit weights . . . prints where you wish on 8½" x 11" forms, or on tickets or strips . . . and for positive weight identification, offers 6 to 12 bank selective numbering, or up to 10 weight identifying symbols. Automatic five digit consecutive numbering is also available.

REMOTE RECORDING, TOO!
Printweigh "400" can give wings to weight data by transmitting it to remotely located adding or other office machines. Brings new flexibility and accuracy to weighing operations.

SEND FOR Printweigh "400" bulletin 1157. Or, ask your Toledo representative. TOLEDO SCALE, Division of Toledo Scale Corporation, 1401 Telegraph Rd., Toledo 12, Ohio.

SERVICE Factory-Trained 240 Cities

TOLEDO®
greatest name in weighing

THIEVES IN YOUR PLANT
Begins on page 168

13. Plant layouts should be surveyed and rearranged to keep office employees and others from passing through shipping or receiving areas or through locations where finished goods are stored.

14. Employee parking should be limited to restricted areas not adjacent to plant buildings.

15. Absence from the plant during working hours to visit parked cars should be forbidden. This practice is a thief's favorite device for getting materials and supplies out of the plant.

16. Insurance should be adequate to safeguard company assets. Fact is, less than 20% of crime losses are covered by insurance. A reliable insurance company or broker can advise on what you need.

3. KEEP RECORDS

Any crime prevention program should include a review of internal controls over inventory. Here are 10 suggestions:

1. Keep perpetual inventory records, preferably on all items, but especially on costly and sensitive materials.

2. Keep raw materials and supplies under control of storekeepers, release them only to employees who hold approved requisitions.

3. Have surprise physical inventory checks made periodically—but not by stockroom personnel.

4. Get public accountants—not plant accountants (who could have something to hide)—to supervise annual inventories.

5. Report results of all physical inventories and test checks to one man (probably an accounting executive) for approval and investigation (if warranted).

6. Adjust perpetual inventory or stock records to agree with physical inventory. Accounting personnel should do the job.

7. Establish a grid block system, where conditions warrant, to control storage.

8. Prenumber or register sales invoices to make sure all merchandise that's shipped is also billed. It follows that invoices should be strictly accounted for.

Turn to page 176

For more facts Circle 546 on Reader Service Card
For more facts Circle 547 on Reader Service Card ➤

TEXACO ORGANIZED LUBRICATION CAN HELP YOU . . .

End replacement parts waste

One Northeastern manufacturer replaced parts in a major machine every two weeks—a not uncommon practice in industry today. He marked it off as a normal maintenance expense. It wasn't really—it was the result of faulty lubrication practices. A Texaco Lubrication survey spotted the trouble—solved the problem. Now the manufacturer operates with a Texaco Organized Lubrication Plan—and the trouble no longer exists.

Chances are the same thing is happening in your plant right now—It doesn't have to.

A Texaco Organized Lubrication Plan can extend parts life significantly—saving thousands of dollars in replacement parts and even more in uninterrupted production for longer periods.

Get full details on Texaco Organized Lubrication from your local Texaco Lubrication Engineer. He can supply you with a copy of "Management Practices that Control Costs via Organized Lubrication." Or write:

Texaco Inc., 135 East 42nd Street, New York 17, N. Y., Dept. F-111.

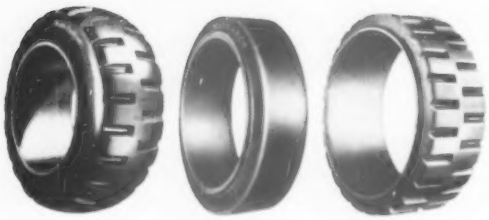
LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

switch to MONARCH SOLIDS and reduce replacement costs!

This was a lift truck tire. Its delivered cost was about $55.00. It was one of four that failed prematurely.

The buyer, who had assumed "all solids are alike", now has a replacement tire expense of approximately $220.00 for a single truck. And his management is asking embarrassing questions!

Selective purchasing could have reduced this maintenance cost. That is why more and more savings-conscious users . . . after comparative performance tests . . . have switched to MONARCH industrial solid tires. Made from the toughest *natural rubber* tire stock developed to date, MONARCH solids give more ton-miles per dollar invested.



FOR DETAILS AND SPECIFICATIONS, ask your Monarch dealer . . . or write direct . . . for Catalog MR-457.

THE MONARCH RUBBER COMPANY
LINCOLN PARK • HARTVILLE, OHIO
- 7-225 General Motors Bldg., Detroit, Mich.
- 2353 No. California Ave., Chicago, Ill.
- Warehouse: Reno, Nevada

826G-M11

For more facts circle 548 on Reader Service Card

at

Contractor: Roland Thompkins & Son, Inc. Hawthorne, N.Y.

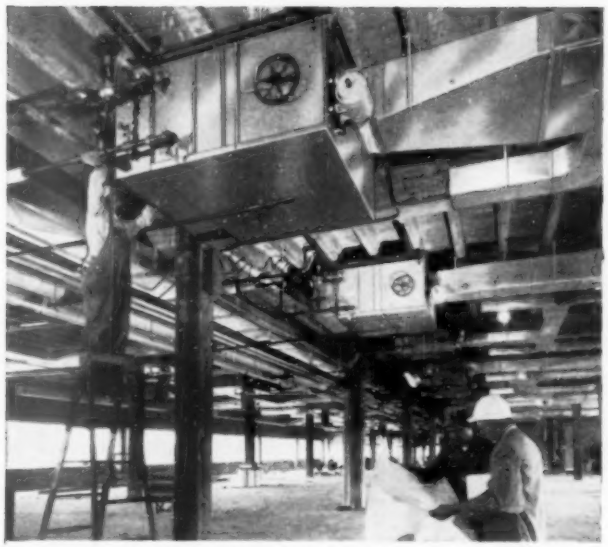
Consulting Engineer: Giffels & Vallet, Inc. Detroit, Mich.

Architect: L. Rossetti Detroit, Mich.

—the Comfort Computation

came out . . .

DUNHAM-BUSH



The Dunham-Bush 'HAH' is designed for ceiling installation which conserves space vitally needed for engineering purposes.

Of course, IBM really didn't employ any of its masterfully precise computers to predetermine whose air conditioning equipment would best serve their new Engineering Laboratory at Kingston, New York.

But all equipment selected was calculated to meet the important demands modern industry must make to ensure personnel comfort and equipment protection.

For example, here at Kingston, 92 engineered Dunham-Bush Horizontal Air Handling units efficiently deliver conditioned air to create the climatic interior that's seasonally required. Dunham-Bush units have operational versatility that enables them to cool, heat, filter, or dehumidify air, according to temperature requirements. Additionally, such Dunham-Bush heating products as finned tube radiation with expanded metal covers, horizontal and cabinet type unit heaters, and F&T traps and strainers are used throughout the laboratory.

Contact your nearest Dunham-Bush sales representative for assistance when your next heating or cooling job arises.

You'll find that this one source—one responsibility is of inestimable value.

Close-up of Dunham-Bush 'HAH' which cools, heats, filters, dehumidifies air.

Dunham-Bush, Inc.

WEST HARTFORD 10 • CONNECTICUT • U. S. A.

DUNHAM-BUSH

AIR CONDITIONING • REFRIGERATION • HEATING • HEAT TRANSFER

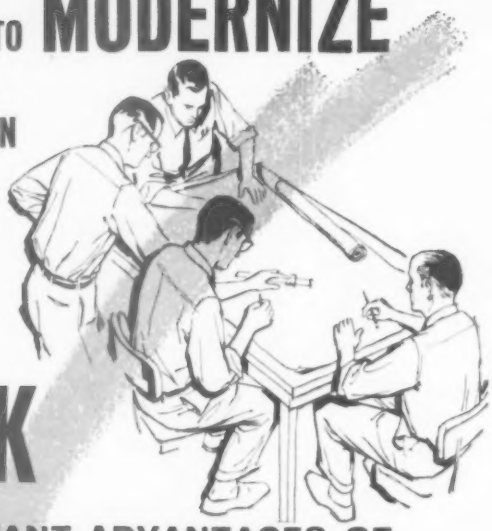
WEST HARTFORD, CONNECTICUT • MICHIGAN CITY, INDIANA
MARSHALLTOWN, IOWA • RIVERSIDE, CALIFORNIA

SUBSIDIARIES

heat-x

For more facts Circle 549 on Reader Service Card

PLANNING TO MODERNIZE
FOR INCREASED PRODUCTION AT LOWER COST?



CHECK

THE IMPORTANT ADVANTAGES OF
STANDARD CONVEYOR'S
EQUIPMENT AND SERVICE

A Standard system of conveyors is *engineered* to your individual production process or physical layout of your plant. Standard conveyors are designed and built to handle volume without halt, congestion or breakdown.

For more than 50 years Standard Conveyor has concentrated on the design, manufacture and application of power and gravity conveyors and related equipment for the handling of varied commodities. This specialization has developed improved design and construction in the conveyor equipment . . . and has given us an invaluable reservoir to draw upon in meeting your material handling problems.

Check with your experienced Standard engineer before you begin your modernization planning. His recommendation will save on initial costs as well as assure continued economies in handling costs for the future.

For Production • Assembly • Packing Lines • Roller and Belt Conveyors

To keep things moving — on production, assembly, processing or packing lines—mechanize your handling with conveyors. Standard furnishes all types — power and gravity, belt, roller, slat, chain, push-bar, sectional.

TO CUT COSTS WITH CONVEYORS—ASK STANDARD

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities

Standard
OVER 50 years of conveyor experience
GRAVITY & POWER CONVEYORS

Call the Standard engineer listed in your classified phone book, or write direct for Bulletin 309—address Dept. G-8.

9. Weigh scrap on a reliable company or public scale and sell on a bid basis under the jurisdiction of the purchasing department. Periodically, verify selling prices of scrap with current market prices.

10. Examine scrap-storage bins and containers periodically.

CASES TO REMEMBER

Here are six actual crime cases—from Liberty Mutual files—relating to inventory losses. They show the need for care in selecting employees and controlling inventory.

1. The hidden crook. One strange case involves an employee who stole a number of fire extinguishers. A review of the defaulter's application for employment showed it was complete in all respects. In addition to personal references, the application included a chronological listing of employment.

Noting a strange entry, our claimsman asked a company official if the reference had been checked or former employers contacted. The answer was a sheepish "No!" The applicant was a personable, well-mannered fellow. He had submitted a complete history of employment.

The strange entry on the application blank indicated that the applicant had worked six months in the federal prison at Leavenworth (Kan.), running a printing press.

• *Moral:* If the former "employer" (the warden) had been contacted, the story would have been different.

2. The paper shufflers. Two stock clerks, employed five years and working in collusion, were responsible for an inventory shortage of over $27,000. The men worked in the stockroom as clerks, storing and preparing shoes for shipment on regular factory orders. Their duties also consisted of running the small factory store, where regular and factory-damaged shoes were sold to employees and their friends. Sales slips were made out for all cash and charge sales. Slips were prenumbered, but no check on continuity of numbers was ever made.

The thieves stole two ways:

Method 1. They carried shoes from the plant after charging them out to themselves or others on

NEW

a super-hard cemented carbide for
high speed, high precision machining of steel

CARMET CA604

now added to Carmet's crater-resistant 600 series

Here's a new product of Allegheny Ludlum research to help you meet today's demand for high speed machining of steel. It's an ultra hard tungsten carbide with unusually high crater resistance, wear life and high strength at high cutting temperatures. CA604 operates in the fast cutting ceramic areas, combines high velocity finishing with light to medium feeds. Field tested for more than a year, CA604 is offered in Indexable Inserts and blanks for mechanical holders.

CARMET OFFERS A CARBIDE GRADE FOR CUTTING ANY STEEL ALLOY

CA 604
Extra hard for high speed, high precision machining.

CA 605
For fine finishing and high velocity cuts of steel.

CA 606
For lighter cuts on all steels and magnetic alloys

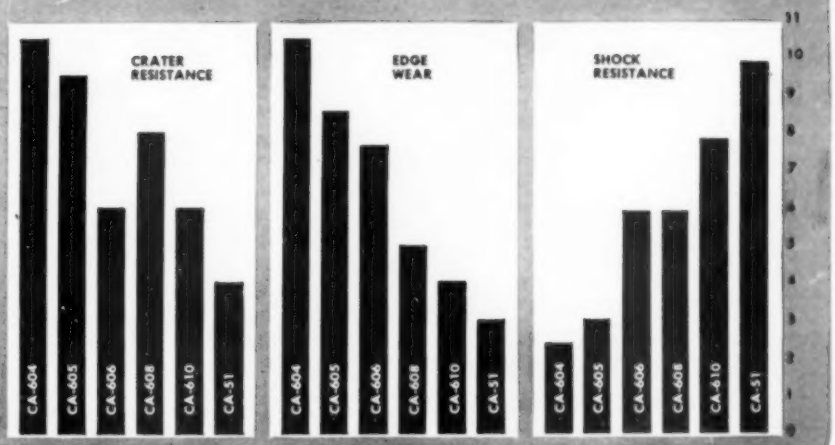
CA 608
For light cuts on all steels; crater resistance.

CA 610
General purpose steel cutting; high shock resistance.

CA 51
For heavy, interrupted cuts; high shock resistance.

Relative Characteristics of Carmet Metal Cutting Grades

This chart shows how grades in the CA-600 Series compare in crater resistance, edge wear resistance and shock resistance. The units of measurement indicate only relationship between grades, not efficiency.



Write for new Catalog C-16

Carmet Cemented Carbides for Industry

This 32-page first edition contains prices and complete specifications on Carmet's full line of cemented carbide tipped tools, Indexable Inserts, blanks and holders. Speed and feed charts, grade comparisons and ordering information included.

ADDRESS DEPT. F-20

Your Carmet Distributor carries Carmet standard tools, holders, and Indexable Inserts in stock, assures prompt delivery and will aid you in selecting the proper grades and styles for economical machining. Call him today or write Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Michigan.

WBW 7887A

CARMET

CEMENTED CARBIDE DIVISION OF
ALLEGHENY LUDLUM STEEL CORPORATION

AL

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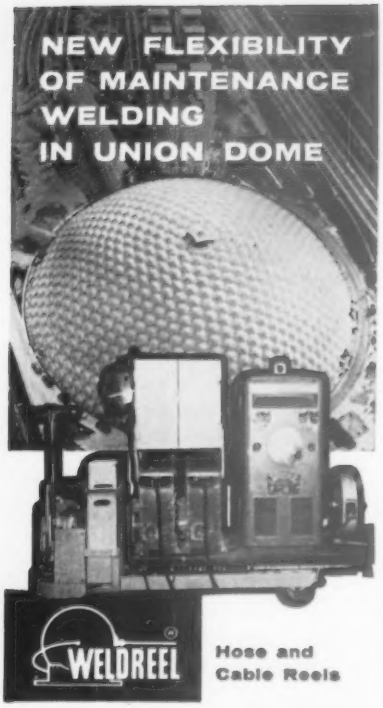

Hose and Cable Reels

AT UNION TANK CAR COMPANY'S new maintenance facility in Baton Rouge, Louisiana, portable welding units like this one, are easily moved right up to the job site by small lift truck. Then welding cable, ground cable and welding hose are paid out as needed from WELDREEL reels.

When a job is completed, hose and cable are quickly rewound onto reels by strong springs, and the entire unit moved to a new location. Not only does this permit maximum use of welding equipment . . . *it also extends life of hose and cable* . . . keeps it off floor when not in use . . . *increases plant safety.*

Designed to handle a wide variety of single and dual hose, and single and multiple cables, WELDREEL reels are available to a wide variety of industrial applications. Write for full information.

MODEL OA-A holds 50' of 3/16" or 40' of ¼" dual hose. Model OAB has capacity for 150' of ¼" or 125' of 5/16" hose.

MODEL EA-2 with current capacity of 300 amps holds 50' of 2/0 welding cable. Model EA has capacity of 100' cable.

MODEL A-1 has 50' capacity of ¼" or ⅜" I.D. single hose. The larger Model A-2 holds 50' of ½" hose.

UNITED SPECIALTIES INC.
POST OFFICE BOX 698 EL DORADO, ARKANSAS

regular sales slips. The duplicates (accounting copies) were marked "Hold." Next day the duplicate sales slips were destroyed. They followed this procedure to cover themselves if they were stopped at the plant exit and questioned about the shoes.

Method 2. They stole shoes at completion of the semi-annual physical inventories. They took the physical inventories and, being agreeable fellows, always volunteered to work after hours to complete the semi-annual inventories. This made it easy to steal shoes unobserved and without fear of being caught.

This loss was detected by accident. A company salesman, soliciting a local retail shoe dealer, was told by the dealer that he could buy the same shoes for less money. On questioning him, the salesman learned that the source of his supply was a company stock clerk. A trap was set, the defaulter caught. His confession named his accomplice.

This loss points up two morals involving principles of internal control in a plant:

- *Moral:* Sales invoices should have been prenumbered and strictly accounted for.
- *Moral:* Physical inventories should have been independently supervised and verified.

3. The warehouse gang. The treasurer of a large coffee manufacturer listened in amazement as a local representative of an international detective agency told him how large quantities of coffee, worth $32,000, had been stolen by his warehouse employees.

He thought the physical inventory was all right. It was taken daily (after each packed production run) and checked each morning (before production started). He also relied on perpetual inventory of packed coffee going in and out of the warehouse. No sizable discrepancies had ever been uncovered. Yet he was told where the coffee was being sold, the registration of the car that transported it, and other details impossible to ignore.

With the help of local police this executive set a trap. It was quick and effective. The driver of the automobile and two employees who

ask your driver
about MOBILIFT
and the stand-up model's 360° steering . . . he'll tell you it means less aisle space needed for him—and means more storage space for you.
Look us up in the Yellow pages or write today for further details!
LAMSON MOBILIFT CORP.
809 S.E. MAIN ST., PORTLAND 14, ORE.

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WANT
TO INCREASE SALES
WITH
DIRECT MAIL?
Try DMCP*
It can help you step up sales at pennies per "call." National in scope and local in operation, this service is a new, successful approach to direct mail selling. It has met with such great success that DMCP offices now are located in more than 25 major cities. There's one near you.
DMCP* is used with success in all fields. It sells industrial equipment and seeds . . . food and flowers . . . milk and insurance . . . the list is endless.
You'll find the full story of DMCP* and how it can help you in our book, "Modern Direct Mail." It tells how you can sell more with direct mail and provides you with cost data, case histories and information on how YOU can get started in a direct mail sales program. The book is yours if you fill out the coupon and mail it to us . . . or request a copy on your letterhead.
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Title
Firm
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NEW MULTI-ZONE PLATECOIL®

An exclusive* TRANTER advancement in heat transfer technology

*PATENTS APPLIED FOR

For new savings on more types of tank and process heating than ever before!

Now you can apply the time-proven cost and performance advantages of PLATECOIL over pipe coils to heating and cooling problems involving pressures up to 250 psi. DURAWELD construction, TRANSTEEL mild steel and MULTI-ZONE coil configuration are brand new design and construction features that provide for higher pressure containment and a margin of heat transfer capacity.

MULTI-ZONE coil configuration with multiple headers produces a reserve capacity for faster start-up and better temperature maintenance. High heat transfer efficiency saves tank space. Light weight makes installation easy and economical. Streamlined surfaces are easy to clean. Eliminate the cost of engineering, fabricating and installing pipe coils. Specify the new MULTI-ZONE PLATECOIL.

Standard PLATECOIL units

FACTORY-ASSEMBLED PLATECOIL banks.

In factory-fabricated styles to fit your needs

ROLLED to specified diameters

SINGLE EMBOSSED OR DOUBLE EMBOSSED

SEND FOR NEW PLATECOIL BULLETIN P60 for complete data and performance characteristics.

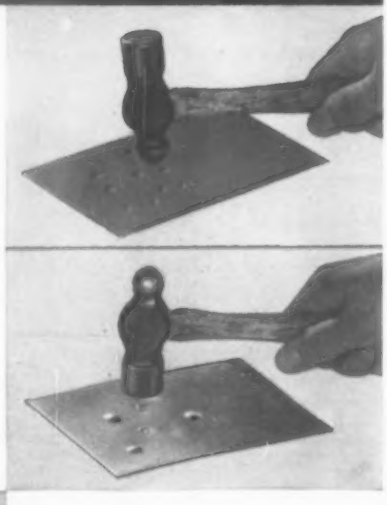
Tranter Manufacturing Inc.

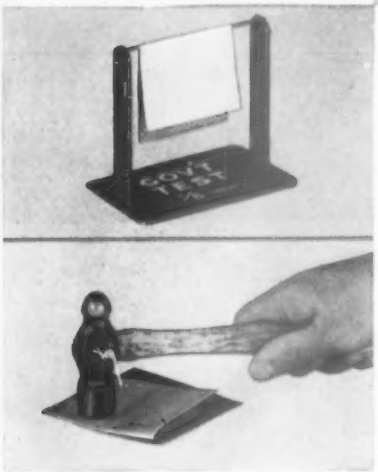
LANSING 9, MICHIGAN

PLATECOIL® DIVISION

SPECTACULAR HAMMER TESTS PROVE AMAZING TOUGHNESS OF VALDURA M & F ENAMEL

POUND IT—turn it over—hammer it flat again! You'll see why M & F prevents tool blows from damaging equipment—keeps fork lift trucks from chipping dados, etc.





BEND IT—hammer it double—pound it out straight...*still* no cracking or chipping! What other enamel can withstand these punishing tests?

BEAUTIFUL AS WELL AS DURABLE... 27 VALDURA M & F ENAMEL COLORS

Valdura M & F Enamel is so *tough*, so *flexible*, it stands up under rough blows and sharp temperature changes that would crack an ordinary enamel to pieces! It defies even the blistering tropical sun, salt spray and icy arctic blasts . . . holds up longer under constant floor traffic . . . adheres to machinery surfaces that vibrate mercilessly. And—Valdura M & F Enamel comes in 27 beautiful colors for use in factories and homes—inside and out. Clip coupon below and mail today.

VALDURA HEAVY DUTY PAINT DIVISION • AMERICAN-MARIETTA CO.
CHICAGO 11, ILL. • IN CANADA, OTTAWA 4, ONT.

VALDURA PAINTS THAT ENDURE

Attach filled out coupon to letterhead and send for sample M & F test chip and color chart.

NAME_____
COMPANY_____
ADDRESS_____

Begins on page 168

had the run of the plant at night were the initial catch. In a few days the police arrested several other employees who admitted participation in the plot.

This was a case of small amounts adding up to a large total over an extended period of time. The coffee came from two sources not included in the inventory: from broken or partially filled cases left at end of the day, and from coffee left in the packing machine hoppers when production was shut down.

From these sources the culprits packaged the coffee and hid the packages in convenient spots for later pick-up. As no inspection was made of packages carried out by employees, the coffee went out wrapped in soiled clothing, shopping bags, or other ways—limited only by the ingenuity of those involved.

• *Moral:* Prevention of losses requires periodic inspection of employees' packages and bundles being carried from the premises.

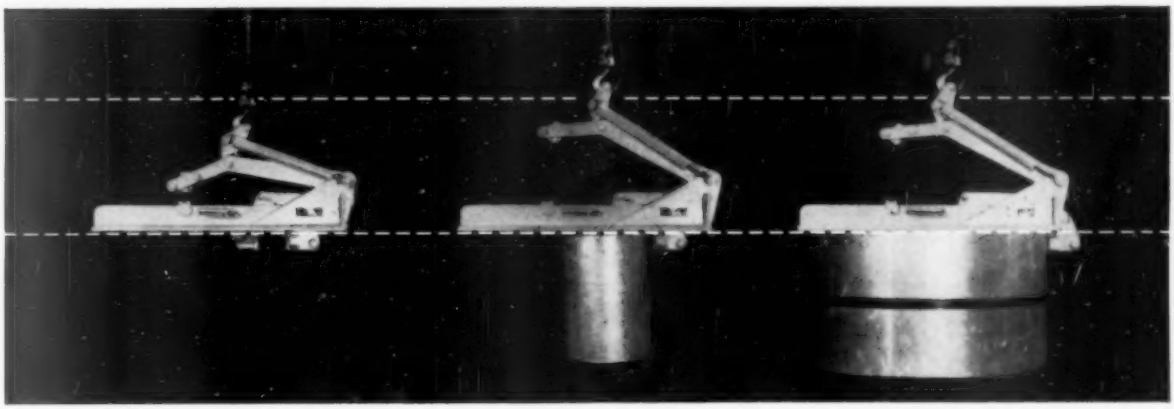
4. The earliest bird. A company salesman told his office that he had met sales resistance because of lower price quotations on specific grades of leather. The company's exclusive tanning process, combined with the adroitness of the salesman, made the leather easy to identify as his company's product. Local and state police launched an immediate investigation that ended in the arrest and conviction of three employees and "fences." Total loss, over $500,000. All six are now serving jail sentences.

The gang used two methods to perpetrate this crime:

Method 1. A company executive, in his capacity as head of shipping, sales, office, and inspection, would usually arrive early to work, ostensibly to check the other employees—but really for another purpose. He would get the shipper and assistant shipper to place certain quantities and types of leather in his automobile. Then he would drive to a predetermined rendezvous, where he would transfer the leather to a local leather dealer's automobile for a ridiculously low price. No. 1 leather dealer would then sell the leather to dealer No. 2 who, in turn, would sell it to a New York leather merchant,

NEW HEPPENSTALL COIL TONGS

stack large and small diameters to within 24 inches of the crane hook



Only two feet high at greatest extension, these new Heppenstall Tongs put more coils into less space, faster. By simple manual adjustments, these tongs handle inside diameters as small as 5 inches and up to 20 inches, outside diameters from 6 to 40 inches, with a 1,000 pound capacity rating. Custom models of this same design will handle coils up to 3,000 pounds. For more information and a quotation, call your Heppenstall Company Representative or send us your load and operating requirements. Heppenstall Company, Materials Handling Division, New Brighton, Penna.

HEPPENSTALL COMPANY PITTSBURGH 1, PENNSYLVANIA

PLANTS: Pittsburgh, Pa. Bridgeport, Conn. • New Brighton, Pa.
MIDVALE-HEPPENSTALL COMPANY • Nicetown, Philadelphia 40, Pa.

Die Blocks • Forgings • Back-up Roll Sleeves • Rings • Industrial Knives • Materials Handling Equipment
Pressure Vessels • Hardened and Ground Steel Rolls

IF IT HANGS FROM A CRANE . . . HEPPENSTALL CAN HANDLE IT

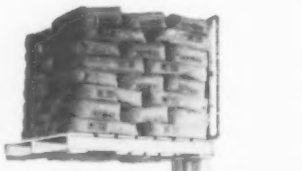
EXPLOSION PROOF
CLASS I GROUP D
POWERED LIFT TRUCKS

Underwriters' Laboratories, Inc.
INSPECTED
TYPE EX
REVOLVATOR COMPANY

APPROVED and PROVEN

8 YEARS ON THE JOB

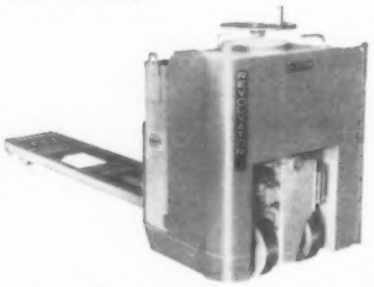
Since 1951 Revolvator Go-Getters, designed for this service, have been specifically approved by leading industrial insurance companies for use in Class I Group D explosion hazardous areas in major plants from coast to coast. User comments like those below show that the Go-Getter has been more than approved by safety authorities . . . it has been proven in use for eight years.



The Plant Manager where the Go-Getter at the left is used says, "In an area where we have explosive fumes, aluminum choloride dust and hydrochloric acid fumes what was previously a difficult, disagreeable job for two men is now easy for one."

Air in the color mixing room of the finishing plant where the Go-Getter above is used carries organic dusts as well as explosive fumes. The foreman says, "The men like the Go-Getter and use it steadily."

Executives in the chemical plant where the model to the right is used say, "We use the Go-Getter in our area which has the most severe hazard." Another plant where quantities of explosive solvents are used for "wash down" reports of a similar model, "We are well pleased and we are ordering another Go-Getter."



A major insurance association writes, "We are quite willing to accept the unit (Go-Getter) as it is designed with explosion proof housings for the motors and controls as usually specified for electrical equipment that can be safely used in explosion hazardous areas."

A nationally known safety engineer writes, " . . . calling the existence of this line of trucks to the attention of the industry as we believe many would want to know about this equipment."

The Go-Getter is the latest addition to a complete line of materials handling equipment for use in explosion hazardous areas that Revolvator has been building for over a quarter of a century.

REVOLVATOR CO.
8761 TONNELE AVENUE, NORTH BERGEN, N. J.
SINCE 1904

Begins on page 168

who then would ship it out of the country. But one dealer got "hungry" and offered some of the stolen leather for sale on the New York market.

Method 2. Insofar as police found out, there was collusion with only one customer. Customer X would place an order for a certain quantity of low-priced leather. The company executive would downgrade certain leathers so Customer X would receive high-grade leather at low-grade prices. Also several additional feet of leather would be added to his shipment at no charge.

The president's suspicions that something was wrong were allayed by the executive who, together with his other duties, supervised physical inventories.

Neglect of two important principles of internal control was the reason this wholesale thieving was able to continue for so long without detection.

- *Moral:* No employee should fill interlocking positions of trust.
- *Moral:* Physical inventories should be taken under the direct supervision of public accountants.

5. The trusted janitor. A janitor, who was least suspected, turned out to know all about the mysterious disappearance of baled gray goods that were stored in an area of the warehouse adjacent to the office. In filling an order, the shipper discovered one specific bale was missing. An extensive search was made for the missing bale without success. A complete physical inventory was then taken at the warehouse. This revealed a shortage of 41 bales valued at $10,738.

A short time later a company salesman accidentally discovered the missing bales at a customer's mill located in New York. With this as a starter, the police traced the bales through various textile brokers, a junk dealer, and finally the warehouse janitor himself.

The janitor confessed. Twice a week, he said, after the plant had closed for the day, he drove his car into the mill yard. In passing the gate watchman, he told him he was going to get wood. (His employer permitted him to take all the wood he wanted.) He parked his car near the office, out of sight of the gate

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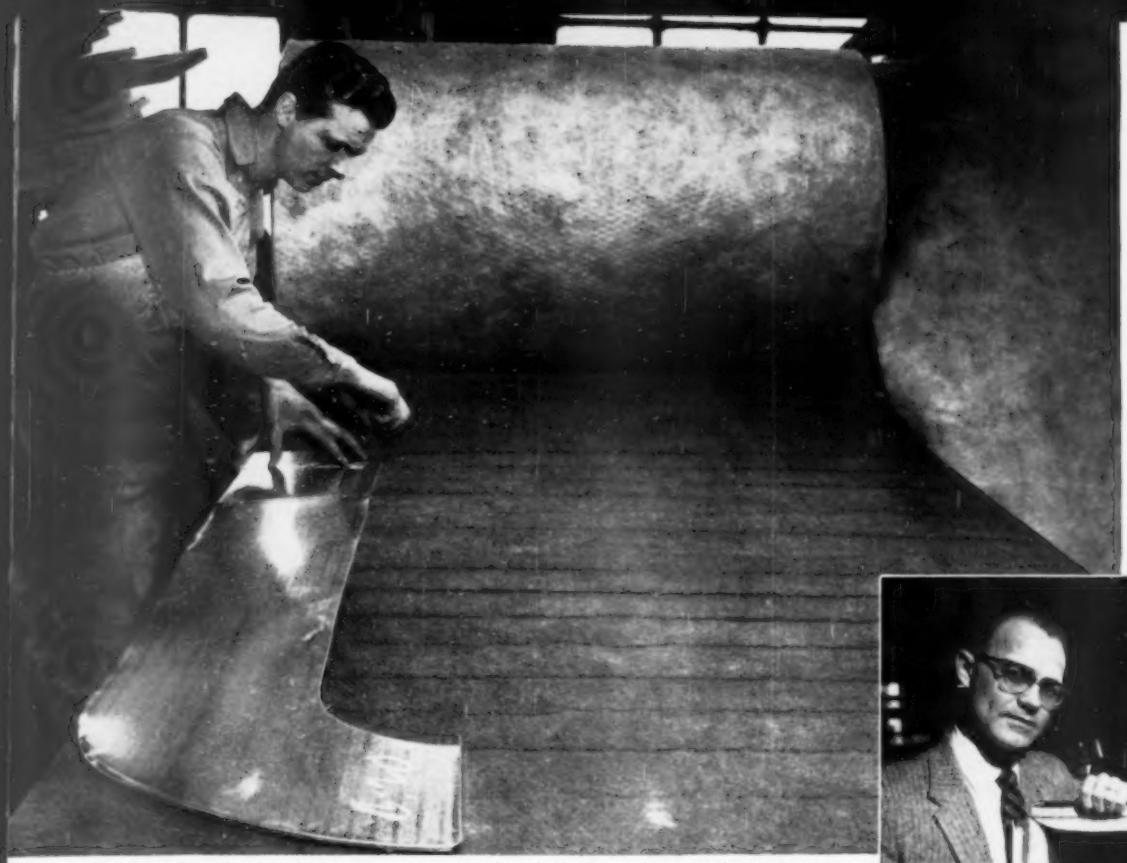
For more facts Circle 559 on Reader Service Card ➤



Pittsburgh Superfine is quickly cut to correct size with a knife. Cut sections are then bonded to duct with adhesive. Extra adhesive is applied to edges of insulation to adhere them to edges of metal.

"We used one-inch, 1½-lb. density Pittsburgh Superfine Fiber Glass Insulation with a Neoprene coating to line all ducts," says Mr. George P. Fenton. "Superfine is flexible, adaptable and easy to handle."

At Greater Pittsburgh Airport's New Extension— Pittsburgh Superfine Insulates Air Conditioning Duct Work

"When our company installed the sheet metal ducts for the two air conditioning systems at Greater Pittsburgh Airport's new East Dock, we used over 7,000 sq. ft. of Pittsburgh Superfine Fiber Glass Insulation as the acoustical and thermal lining for the ducts," reports Mr. George P. Fenton, General Manager, McIlroy Sheet Metal Engineers and Fabricators, Pittsburgh, Pennsylvania.

Why Pittsburgh Superfine was specified

"This job called for an insulation that could withstand air velocities, would have proven erosion resistance, would provide good acoustical properties at minimum cost, and would insure resistance against temperature differential. Pittsburgh Superfine met all these requirements easily."

Easy to work with on the job

"We've used Pittsburgh Superfine often, and know from experience that it's flexible, adaptable, easy to handle and easy to cut. It's especially adaptable for use in irregularly curved ducts. There was not a single installation problem on the airport job that we could not handle with Superfine," concluded Mr. Fenton.

Pittsburgh Superfine Fiber Glass can help you, too!

It's rot proof, fire-resistant . . . and it's the finest insulation against heat, cold or noise you can get! Available in a variety of facings to meet your needs. For complete information, write to *Pittsburgh Plate Glass Company, Fiber Glass Division, One Gateway Center, Pittsburgh 22, Pa.*

PITTSBURGH SUPERFINE IS A PRODUCT OF THE FIBER GLASS DIVISION OF PITTSBURGH PLATE GLASS COMPANY

Sales offices are located in the following cities: Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, Minneapolis, New York, Philadelphia, Pittsburgh and St. Louis

FIBER PG GLASS PITTSBURGH PLATE GLASS COMPANY

watchman, and entered the warehouse through the office (to which he had a key). After placing two bales of gray goods in his car each trip, he left the premises without being stopped by the watchman. He delivered the bales the next morning to the local junk dealer.

Ordinarily employee automobiles were not allowed anywhere within the mill area. The janitor was the exception to this rule.

• *Moral:* Employers who condone deviations from prescribed procedures invite employee dishonesty.

6. The loaded toolkit. When the remnant-store manager of a large textile mill was asked to match the cloth in a customer's skirt, he discovered theft running to $25,000 worth of cloth.

The manager recognized the cloth as part of a special government order, all of which—remnants, too—was to be delivered to the purchaser. The customer said she bought the cloth from a mill-end store in a nearby city (just nine miles away).

Mill detectives immediately went to the store. They found there hundreds of yards of various remnants produced by their mill. Also they learned the identity of the remnant supplier. It was a boss elevator mechanic on the mill payroll, who was permitted free access to all parts of the mill premises.

Detectives knew that all remnants were created in the cloth inspection room and moved by hand truck along a fairly isolated passage. They watched this passage from concealed positions and saw the trucker stop to remove cloth remnants and hide them behind stockpiles of raw wool. Later they saw the boss mechanic's helper pick up the hidden cloth and pack it in his toolkit.

Caught with the goods, this helper confessed to his part in the conspiracy—to carry the cloth out of the plant in his toolkit to his boss's car. The car was parked outside the mill area and watchmen at the mill gate never questioned the comings or goings of maintenance employees or bothered to check their toolkits. Thus the gang had no problem in removing the cloth from the mill. An afternoon search of the boss mechanic's car uncovered a sizable quantity of remnants.

The conspirators admitted only what could be proved against them. all had been employed by the mill for more than five years. Little out of the ordinary was turned up about the helper or the trucker, but the boss—the "brains" of the trio—had gained a reputation as a bootleg king during the Prohibition era. Over a period of years his personal activities had included quick-turnover real estate dealings. Also he had been a consistent purchaser of U. S. savings bonds, some in large denominations.

• *Moral:* A periodic check of mechanics' toolboxes on a surprise basis by watchmen will lead to early discovery of thefts and apprehension of the culprits. **END**

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You name the job or jobs to be done! We'll supply a crane or cranes that will do it. Standard Models in a wide range of styles, sizes and capacities will generally meet your requirements. If not, we'll engineer and build what you need. We've been doing it for more than 40 years.

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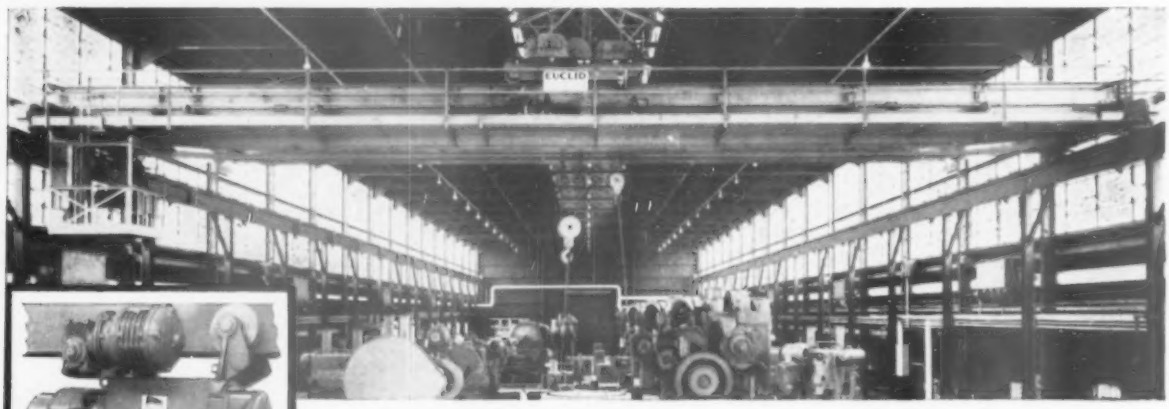

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EUCLID HOISTS are highly efficient and strictly modern in every detail with oversize anti-friction bearings and heat treated steel parts in combination with a welded frame.

The planetary gearing and mechanical load brake are mounted in oil tight housings. The hoist gearing is assembled in the hoist drum.

This design produces an unusual compact, rugged and accessible hoist readily adapted to various installations and types of control.

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This remarkable industrial flooring is built to do a better job in plant and factory areas. It's greaseproof and acid-resistant – easier and safer to walk and work on – and can take the abuse of in-plant trucking. It's the answer to lower floor costs per square foot per year in your plant. Let Duraco prove itself in your plant without obligation to you. Our representative will be glad to discuss the details of the Duraco Test Area Program with you.

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We are interested in Duraco. Please have your representative call to discuss the Test Area Program with us.

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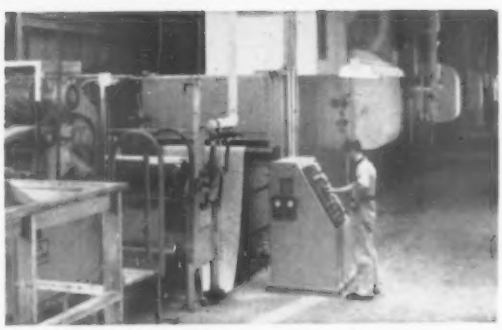
THE KEY REQUIREMENT ENGINEERED IN MANY MANUFACTURING OPERATIONS

Baking, drying, curing, cooling, conditioning...operations like these, widely used in industry, call for carefully designed and precisely controlled atmospheric conditions within an enclosure.

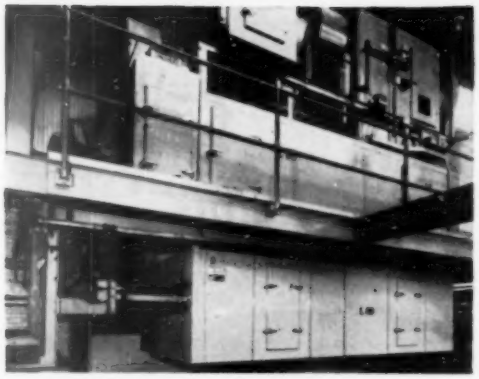
- Often these operations are at elevated temperatures — 400°F, 500°F, 600°F — where variations must be kept within 4° plus or minus or even less over long periods.
- Some require zoned systems, with sealed enclosures, where work passes through at different temperature levels.
- In others, close range impact of heated air directly on the work has to be assured as it travels through the enclosure.
- Occasionally, rapid and controlled cooling is part of the system where the work passes from the heated oven or dryer into atmospheric or subnormal temperature.

In all of these, the atmosphere prevailing within the enclosure is the key processing requirement. It is something that must be **precisely evaluated,** provided for, and controlled.



Ross Oven for Curing Core Stock used in Laminated Plastics

Ross Oven used in Metal Decorating

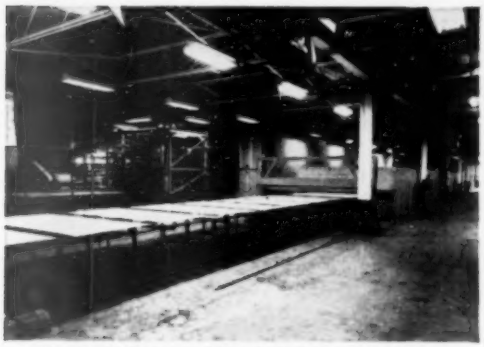


Ross Oven used in the Processing of Plywood

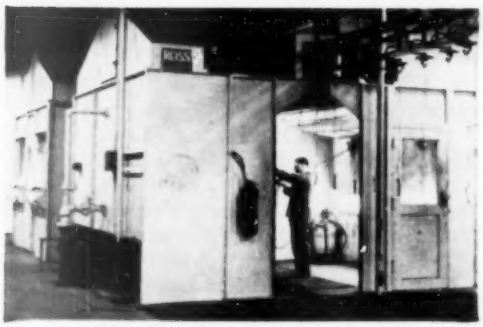
Yes, the expression "Engineered Atmosphere" is the truest description of this key requirement of many manufacturing operations. And it is in this broad field of Engineered Atmospheres that J. O. Ross Engineers have established an enviable reputation for "know-how." The thousands of successful Ross Systems throughout the United States and Canada and in many other countries bear witness to the skill with which the systems are designed and the care with which they are installed.

Two seemingly conflicting problems confront management today: modernize or expand. If you are concerned with such a decision and it involves any of the above operations, discuss the matter with a Ross Engineer. His knowledge and suggestions will be helpful.

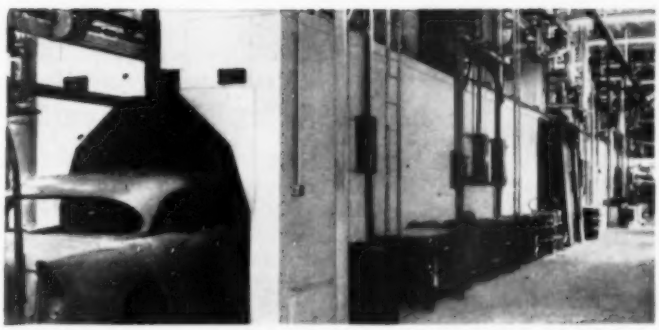
ATMOSPHERE



Ross Oven for Drying Phenolic-Resin Saturated Webs



Ross Water Wash Spray Booth, part of complete Ross Paint Finishing System



Section of Ross Automobile Body Paint Finishing System; Wet Sanding Dry Off Oven

M-R

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By PAUL A. KING, Attorney, Bigelow-Sanford Carpet Company, Inc.; Member, New York Bar

Be Sure to Hang Onto Your Seniority Rights

Seniority is not the union's business. It's your business. And if you turn over control of seniority to the union, you're apt to run into a peck of trouble.

Battle-fatigued plant executives who hassle each day with the union welcome any opportunity to relax and say to them: Brother, do what you want. This is *your* picnic, not *ours*. And determination of worker seniority is one of those areas where relaxation is apt to set in frequently. Who cares which employee is at the bottom of the list as long as there are employees around who can do the job?

Don't agree too quickly that seniority is a union problem. The National Labor Relations Board made it pretty clear that it takes a dim view of employers who give control over seniority determination to unions. In the case of the Pacific Intermountain Express Company, decided several years ago, an employer who did surrender control was held to have committed an unfair practice.

The company let the union work up the seniority lists. The lists were used for layoffs and job assignments. But there was a peculiarity in the method the union used. Instead of commencing seniority with the date of employment, the union used the date on which the employee joined the union.

The NLRB thought that giving control over seniority to the union, especially with this seniority procedure, would encourage union membership. The contract said that seniority determination must be made without regard to union membership. The board found the company guilty of an unfair labor practice by its failure to exercise its rights.

In a more recent case, the Armour Company (Chicago) escaped such a fate when it dumped a seniority problem into the union's lap. But Armour, nevertheless, ended up with a lot of legal trouble.

The seniority clause of the Armour contract was ambiguous, as it applied to certain employees. Any one of two interpretations could be adopted. Armour decided "that since the contract did not compel one result rather than the other and since it made little difference to the company where the drivers involved were placed, the company's position on that particular grievance ought to be left to the union. The important thing was to pin down the union to a definite position and thereby avoid the possibility of further grievances and a risk of back-pay liability."

The majority of the NLRB decided that by doing this Armour had not delegated "complete control over seniority" to the union. The union's authority terminated when this problem was solved. But Board Member Rodgers dissented. In the next case, he may swing his fellow-members his way.

But also note this: Armour's solution was not a bed of roses. It still had the expense and trouble of an NLRB proceeding. Would it have been better for Armour to pick an interpretation of the seniority clause, process any grievance that might have come up through arbitration and then let the arbitrator be the final judge? Grievances involving large dollar expenditures often can be rushed through arbitration. Arbitrations have even been held before the employer made a decision—sort of an advance ruling comparable to a declaratory judgment-in-law. Better yet, a more carefully drafted seniority clause might have avoided a lot of trouble.

Share the Work? No!

Work sharing (as opposed to layoffs) has many pluses. But there's a good chance you won't be able to get away with work sharing unless you have a clause in the contract.

When business slacks off and you've got to cut back production, reducing the work week for all workers from 40 hours to something less than that may not be the answer—unless your contract has a work-sharing clause. It's surely not the answer if your seniority and work-week clauses resemble those of the Electric Auto-Lite Company. This company found that its shorter work-week program landed it into an Ohio court and the judgment of the court landed where it hurt most—the company's pocketbook.

Electric Auto-Lite's No. 3 seniority man, with other workers in that department, was told not to come in on Fridays. Because of a cut-back in production, there would be no work. But, being the tenacious type, he came in for seven consecutive Fridays anyhow and, of course, found there was no work. Being also a cute cookie, he sued the company for the days not worked. He contended that under the union contract he was entitled to a full week's work until probationary employees and those with less seniority than he had were laid off. The Ohio court said he was right.

The court first decided that this employee had the right to sue on the union contract. As a third-party beneficiary he could sue the company to enforce a contract right.

Then the court looked at the contract's "Working Hours" clause which went like this: "Eight (8) consecutive hours except for the lunch period shall constitute a normal work day and forty (40) hours of five (5) consecutive days (Monday, Tuesday, Wednesday, Thursday,

"We've reduced our scrubbing time from 70 to 7 man-hours ... and our floors have never before been so clean!"

— says Foreman of
BURNY BROS. BAKERY, CHICAGO

Garage and stockroom floors in Burny Bros. large, modern bakery get daily scrubbing with a *Job-Fitted Combination Scrubber-Vac* and *Setol Cleanser*

THEY'RE an unbeatable team to speed the cleaning of oily, greasy floors. *Here's why:* A *Scrubber-Vac* completely mechanizes scrubbing. It applies the cleanser, scrubs, flushes if required, and picks up (damp-dries the floor) — *all in one operation! Job-fitted* to specific needs, a *Scrubber-Vac* provides the maximum brush coverage consistent with the area and arrangement of the floors. Its teammate, *Setol Cleanser*, is specially designed for the greater speed of *combination-machine-scrubbing* ... emulsifies grimy oil and grease *instantaneously* for fast, thorough removal by the machine's powerful vac. Moreover, *Setol* retains its strength longer than average alkaline cleansers. This, too, speeds the cleaning process ... saves on materials ... and cuts operating time of the machine, which in turn reduces labor costs. The *Scrubber-Vac* shown above is *Finnell's 213P*, for heavy duty scrubbing of large-area floors. It's *self-propelled*, and has a 26-inch brush spread. Cleans up to 8,750 sq. ft. per hour (and more in some cases), depending upon condition of the floors, congestion, et cetera. (The machine can be leased or purchased.) *Finnell* makes a full range of sizes, and *self-powered* as well as *electric* models ... also a full line of fast-acting cleansers. In fact, *Finnell makes everything for floor care!* Find out what *you* would save with *combination-machine-scrubbing*. For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2508 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

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STRATHMORE

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"The installation of Rubbair Doors has really solved three problems for us," said Mr. J. S. Mudgett, Chief Engineer, Strathmore Paper Co., West Springfield, Mass. "The first problem was the necessity for a door that would permit a free flow of heavy fork-lift truck traffic without requiring a stop to mechanically operate a conventional type door. The second problem was considerable heat loss to open warehouse area which was reduced by fast closing action and air seals. The third problem was maintenance costs which have been reduced because of the flexibility of the door. Of course, other benefits have been realized such as safety for workmen as well as a considerable reduction of dust and dirt from the loading platform."

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- Flexible construction
- Safety-cushion nose
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If you have an industrial door maintenance problem, let us help you solve it. Write us the details or send for a free illustrated catalog.

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and Friday) shall constitute a normal week's work except when a holiday occurs on these days, in which event thirty-two (32) hours shall constitute a week's work."

Finally the court looked at the seniority clause: "When it becomes necessary to reduce the working force of a department, probationary employees will be laid off first. Thereafter layoffs will be made according to seniority to provide normal 8 hours per day and 40 hours per week for employees in the polishing and buffing department. . . The committee will fully consider any proposed deviation from the above procedure."

Having looked at both clauses, the court concluded that seniority rights of employees are not to be taken lightly. "Seniority rights so fixed by contract will be protected by the courts as property rights." It declared that the seniority rights clause in this case was very definite about the handling of layoffs and must be followed. Ordered the company to pay the No. 3 seniority man for days lost.

Wooing the Professionals

Not happy with the resistance to unionism that professional and technical workers are putting up, the AFL-CIO decided to get on the ball. Find out how to break it down. Here's their first step.

The call went out for a representative of 13 unions to meet with the AFL-CIO's Industrial Union Department. Subject of the meeting was the union's chief worry: What to do about resistance to unionism by professional and technical employees. Five unions didn't show up. Not invited were the Office Employees International Union and the American Federation of State, County and Municipal Employees. But they showed up anyhow. The OEIU came to find out how a "technical" employee was going to be defined. Would it include operators of high-grade machines?

But this was small stuff to the Industrial Union Department. Big problem for the IUD: Why wasn't progress being made in lining up professional and technical employees for unionism? Hunched IUD's Director Al Whitehouse: They want a kind of professional identification and service which frequently outruns the capacity of a single union to provide. For example, what position should the union take on education problems affecting scientists and engineers? How can their full skills be utilized?

The answers may be found in the five-point program laid out for the IUD:

1. Set up an institute to educate union organizers in the problems of professional and technical workers.
2. Analyze current union contracts that cover these specific groups.
3. Work out a program of state and federal legislation that might help them.
4. Distribute literature showing how well these groups make out when they join a union.
5. Give out material on these workers to interested affiliated unions.

Turn to page 194

 For more facts Circle 564 on Reader Service Card

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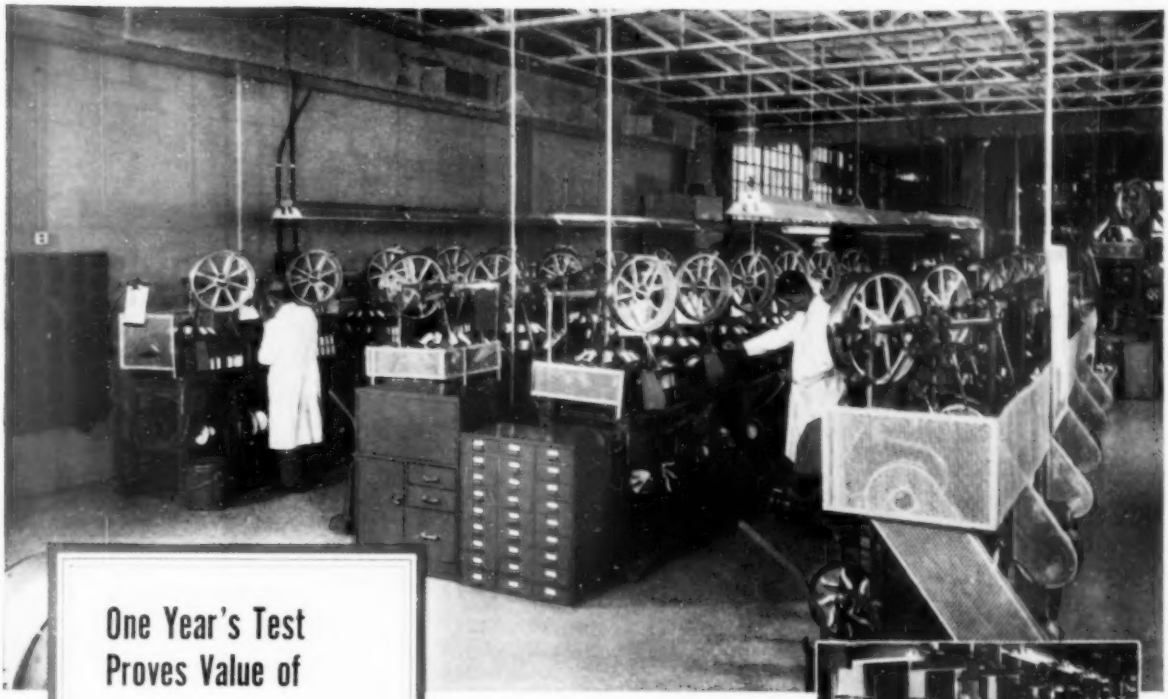


One Year's Test Proves Value of Pittsburgh Color Dynamics® in Hitemp Wire Plant

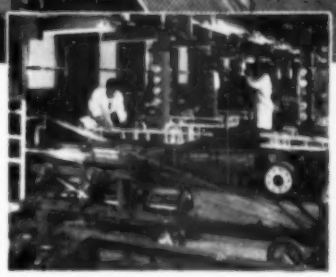
Modern painting system improves efficiency and morale so well it is used throughout specially designed new factory.

One year's test of Pittsburgh COLOR DYNAMICS proved so successful for Hitemp Wires, Inc., of Westbury, N. Y., that this modern system of painting has been used throughout its new 43,000 sq. ft. structure.

● **Hitemp Wires, Inc.,** has grown within seven years into one of the leading manufacturers of high temperature insulated wires and cables. Its products are sold to leading manufacturers of missiles, aircraft and electronic equipment.

● **How COLOR DYNAMICS has helped** to improve efficiency and morale in the Hitemp plant is best told in the words of George F. Rolfe, president: "About a year ago, our rapid growth required the leasing of temporary space. This presented an opportunity to try COLOR DYNAMICS. The results in efficiency, morale and safety for our workers proved so successful, we decided to adopt this painting system as standard throughout our new plant which was especially designed for our kind of production.

● **"Walls, ceilings and every piece** of machinery and equipment were painted according to this system. Moving into this new, efficiently designed structure has improved both volume and quality. While we believe the new facilities have contributed to this betterment, COLOR DYNAMICS has also proved to be an important factor.



● **"COLOR DYNAMICS** has made our new plant more pleasing to the eye, as well as aiding efficiency and morale. It has encouraged good housekeeping and cleanliness, a serious problem in our kind of plant because of the variety of miscellaneous small items used in processing wires and cables. We can heartily recommend this system of painting to industry as a key to improving efficiency, morale and general working conditions."

● **Why not test** the practical value of COLOR DYNAMICS in your plant? Try it on a machine or two, or in a complete department—and see the difference it makes.

Get This FREE Color Plan for Your Plant

• For a complete explanation of the way COLOR DYNAMICS can make your plant more efficient and safer, send for our free, comprehensively illustrated booklet. It tells you how to put color to work for best results. Better still, we'll gladly make a complete color study of your plant or any part of it without cost or obligation. Call your nearest Pittsburgh Plate Glass Company branch. Or mail this coupon.

Send for a Copy of this FREE Book

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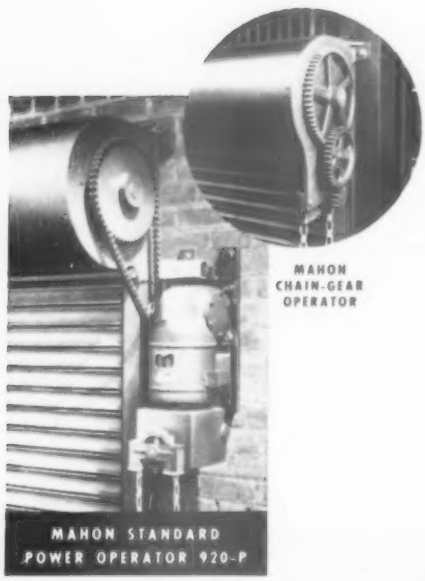

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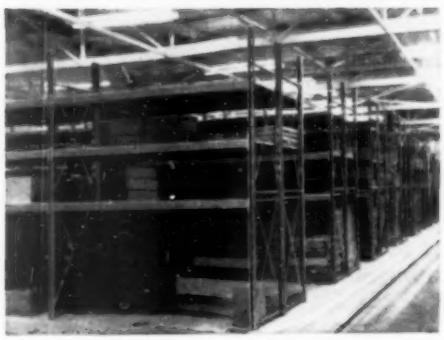
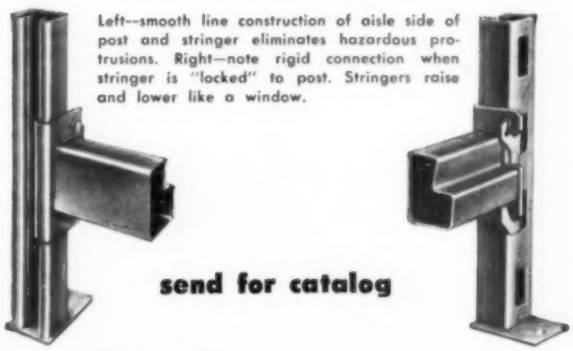


Left—smooth line construction of aisle side of post and stringer eliminates hazardous protrusions. Right—note rigid connection when stringer is "locked" to post. Stringers raise and lower like a window.



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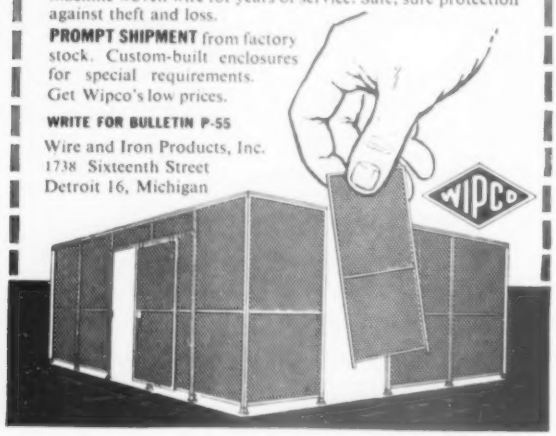

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Guidelines From the Past

Personnel men must become past-practice watchers if the language of the union contract is to mean anything.

This statement could well appear in the job description of every personnel manager: "Prevent past practices from developing. Be a past-practice watcher."

Past practice has been used by arbitrators as a reason for allowing employees to continue an activity not covered by the union contract. A management rights clause cuts no weight.

One company's clause clearly stated that rights not expressly given away in the union contract were retained. The contract said nothing about lunch hours. The natural conclusion an employer might come to is that he could establish a one-half-hour unpaid lunch period. But natural or not, Arbitrator Jay W. Murphy ruled he couldn't do it.

For five years a good part of the company's employees worked eight hours, ate on the fly. But after five years of this the company decided to call a halt. Announced a new half-hour lunch rule. It wasn't long before the rule traveled the grievance-procedure route and ended up in an arbitrator's lap. In support of his ruling against the company, Arbitrator Murphy pointed out that the no-lunch-hour practice had been going on for a long time. Employees had adjusted their lives to it. A past practice had developed that couldn't be changed by the employer. At least, it couldn't be changed without employee sanction.

Murphy gave no weight at all to the company's argument that since the contract contained a clause that the contract represented the entire understanding of the parties, no employee practice was binding on it unless written into the agreement.

Moral: It appears that a company wishing to keep its contract rights intact must nip past practices in the bud. Better yet, don't let them begin. Or, where you feel an exception must be made, put it in writing, set a time limit on it, and get the union to agree to it—if you can. Or again, stop the practice from time to time, just to show that it is an exception.

Rules for Visiting

Employees who leave their work places to see the shop steward without first getting foreman okay, do so at their own peril.

When workers leave their benches to visit friends willy-nilly, it's not long before production is shot to hell. The antidote: a rule prohibiting employees from leaving their work stations during scheduled work periods (except in the performance of the employee's duties) without authorization from the foreman. To cut out idle chatter and idle hands, Walker Manufacturing of Wisconsin issued such a rule. The new rule was announced at the same time as other rules that went to arbitration. It was endorsed by the arbitrator as being reasonable.

But Walker still had visitation problems. Workers left their benches to take up grievances with the steward

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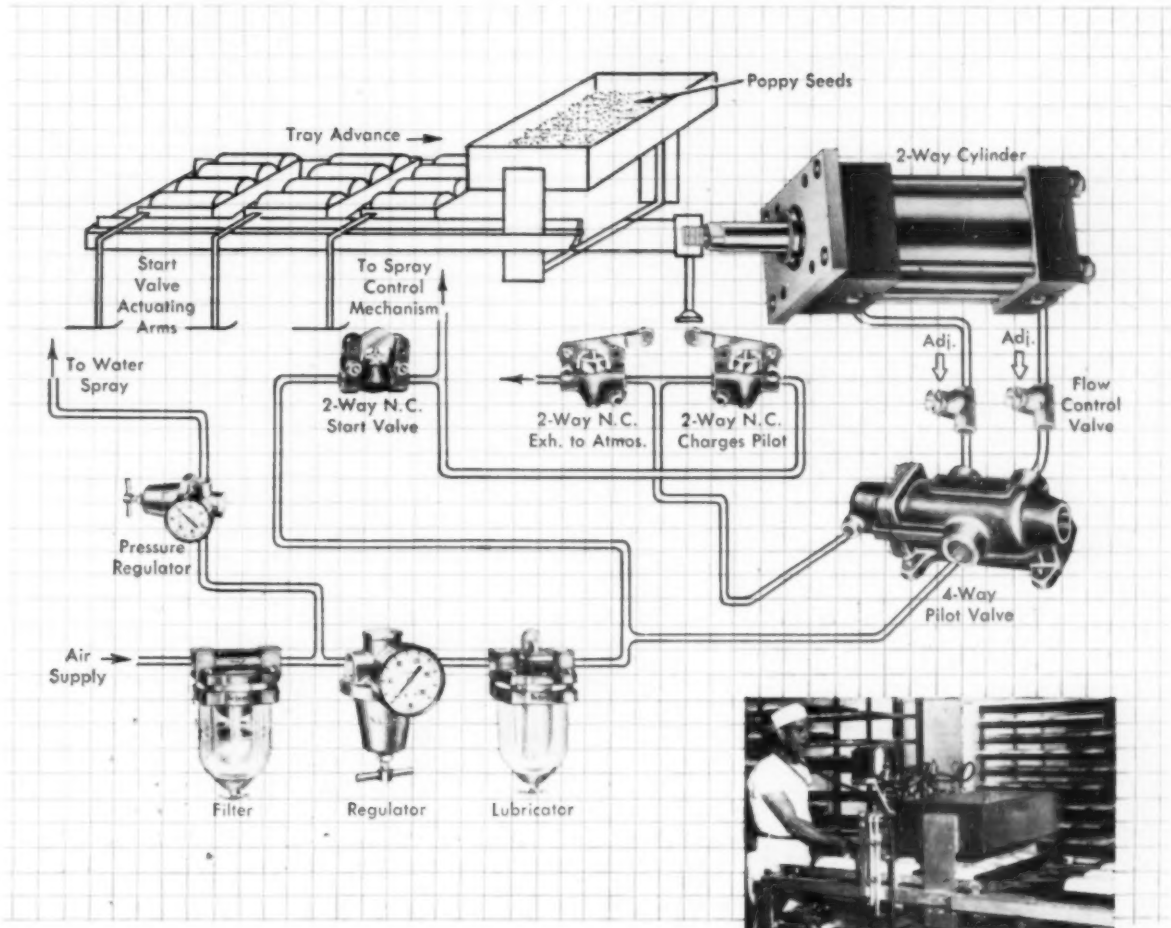

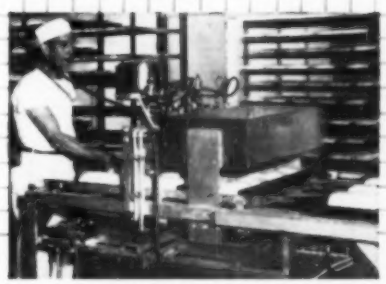

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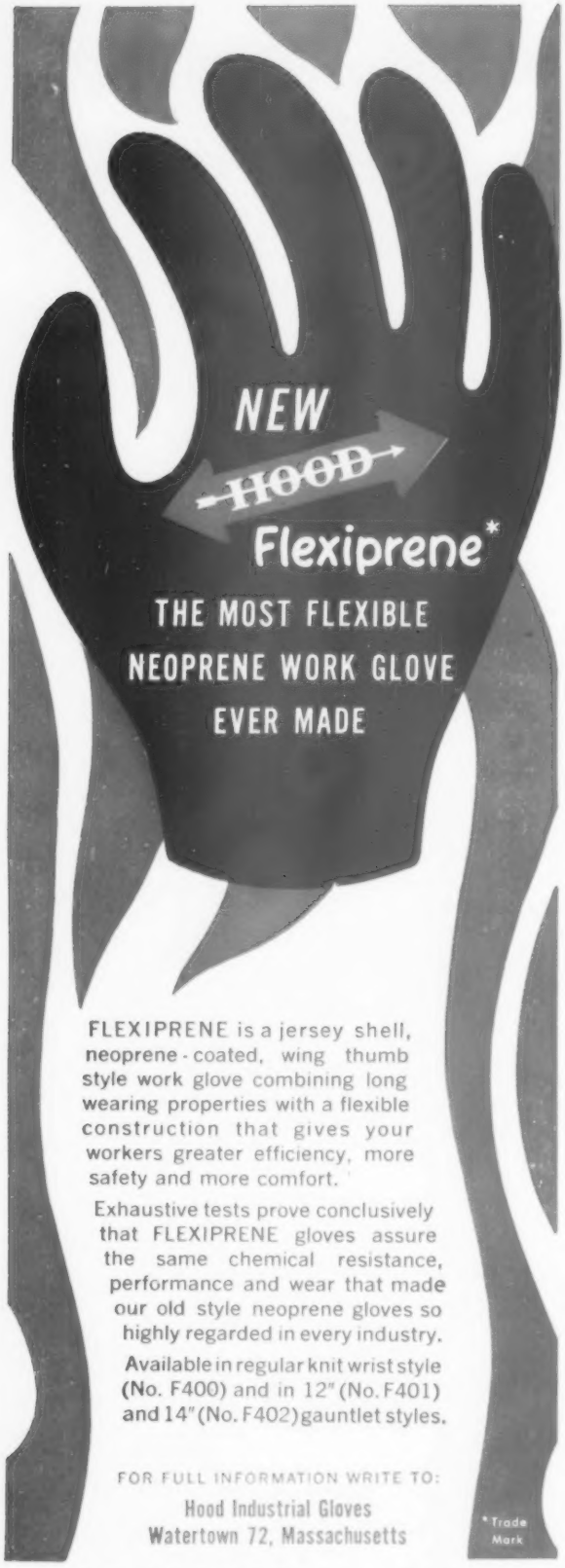
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Begins on page 188

on another part of the floor without authorization from the foreman. The company said that under the rule authorization was required. The union said no, hauled out the contract's grievance procedure clause which read: "An employee having a grievance may first raise it orally at the foreman level with his steward." Once more an arbitrator was called in—this time to review this specific rule and this specific situation. And again the rule survived.

Under the rule, Arbitrator Bert Luskin argued, the employee had to go to his foreman first for authorization. It was then up to the foreman to make arrangements for the visit with the steward. Either he would call the steward over or give permission to go to the steward. There was nothing wrong with this procedure because there was no question about the foreman being compelled to set up a meeting. On this the grievance clause was very clear. The only question for the foreman to decide was where the meeting would take place and this prerogative could not be denied.

Performance Bonds Are Taboo

In this case the employer insisted on a performance bond from the union and was held to be out of the ball park.

Taking its cue from its construction contracts, Cosco Products Company of Florida wouldn't sign a union contract unless the union put up a $100,000 performance bond. Or unless the international signed the agreement and took on the responsibility for contract violation. Insistence on these provisions as a condition of entering into a contract was an unfair labor practice, the National Labor Relations Board advised Cosco.

Jury Pay for Swing Shift

Is the second-shift employee entitled to jury-duty pay when he fails to show up for work?

In most contracts you'll find clear language that compels the company to pay workers who are on jury duty the difference between their regular pay and the amount given them for jury service. But often you'll find nothing at all on how you handle the employee who is supposed to work on the second shift (4 p.m. to 12:30 a.m.). Suppose he does jury duty in the afternoon and fails to show up for his second-shift job?

Civic-minded but non-dollar-conscious Arbitrator Milton T. Edelman ad-libbed this answer: The whole idea behind the jury-duty clause is to encourage employees to accept jury duty by seeing to it that he sustains no money loss. Making an employee sit in the hot jury room all morning and forenoon and then work from 4 p.m. on is not consistent with this pay principle.

Arbitrator Edelman awarded the employee pay for the second-shift work, thus pleasing the employee and his union but probably losing a lot of employer following. Most employers feel less civic-minded and more dollar-conscious than this arbitrator.

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by John Hickey,
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Plan '59

To modernize now for growth and profits

Goes Into High Gear

In 1959, industry will spend more money than ever before to modernize its plant and equipment. But it is not spending enough to do the job that needs to be done.

Manufacturing companies* now plan to spend a total of $24.5 billion on modernization in the four years 1959-1962. This will be enough to replace roughly 70% of the obsolete facilities that were on hand at the beginning of 1959. But it will still leave us far short of our goal. It would take several years, at a higher rate of investment than is now planned, to wipe out obsolescence and give the U. S. a truly modern industrial plant.

These facts stand out from the 12th annual Survey of Business' Plans for New Plants and Equipment just completed by the McGraw-Hill Department of Economics. This new survey shows that industry has made a remarkable start on the modernization job that a previous editorial in this series described as "the most expensive task to be performed in America in this new year of 1959." The full cost of modernization has been found by the McGraw-Hill Department of Economics to be $33.3 billion for manufacturing, and $95 billion for all business.

For the past several months, McGraw-Hill publications have been devoting special attention to new developments in plant and equipment that offer opportunities for modernization. Our special effort to help industry in this regard has been called "Plan '59": to modernize *now* for growth and profits. This editorial will summarize the progress made so far with "Plan '59" and point out some of the areas where business and public policies can do still more to accelerate the modernization drive.

A Good Start

Business investment in new plant and equipment has picked up sharply since the low point of the 1958 recession. Plans for 1959 now show a 7% increase over 1958 for total capital investment. And the increase in expenditures for modernization is much sharper. Moreover, companies already have substantial plans for the years after 1959. New orders for industrial machinery, which are a good index of modernization plans, also are running well ahead of last year.

For the four-year period 1959-1962, manufacturing companies expect, on the average, to devote 65% of their plant and equipment outlays to modernization. This is the highest proportion reported in a McGraw-Hill survey since 1950. In dollar terms, manufacturing companies plan to spend $24.5 billion on modernization during the next four years.

This is an impressive figure, but it does not look so large when compared with the total need

*Excluding petroleum refining, which is reported as part of the oil industry in the data discussed in this editorial.

for modernization in manufacturing industries. As noted above, a previous McGraw-Hill study (conducted in August 1958) found that it would cost almost $35 billion to replace all the facilities that manufacturing companies then considered obsolete. Thus, present plans for modernization are enough to wipe out only 70% of the backlog of obsolete facilities by 1962—and this makes no allowance for the additional facilities that will be made obsolete by new machines and new processes introduced during the next four years. When these new developments are considered, present plans for spending may represent only half the job that will actually need to be done.

How To Accelerate

What can be done to accelerate the drive to modernize our industrial plant and equipment? Two of the greatest aids would be:

(1) Improve present provisions under the tax law for depreciation, to help industry retain more of the money it needs to carry out this massive job of modernization;

(2) Contain inflation, to preserve the purchasing power of the money industry sets aside to replace obsolete facilities.

At first glance, the supply of funds from depreciation allowances appears to be more than adequate. For manufacturing as a whole, depreciation allowances—the primary source of cash for modernization—will total $8.3 billion in 1959, compared with present modernization plans of $6.4 billion. Thus some extra funds will be available to support a further step-up in modernization in 1960.

Unfortunately, however, these depreciation funds are not evenly distributed from industry to industry, or from company to company. For example, in several of the metalworking industries, the prospective flow of cash from depreciation during the next four years is much less adequate than for manufacturing as a whole. These are industries with relatively large modernization backlogs, and they also are industries made up mostly of small or medium-size companies that have difficulty tapping the public money market.

As a result of these industry and company differences, there are many individual cases where shortages of funds limit the amounts of modernization now planned. In the McGraw-Hill survey, nearly half of all companies participating said that they would spend more on new plants and equipment if the depreciation allowances permitted by the tax law were increased substantially over the next few years. Most of these were relatively small companies. Their answers suggest that revision of the tax rules on depreciation should receive the most careful consideration as a spur to faster modernization.

The problem is complicated also by the threat of further increases in the national price level, which would necessarily include prices of capital goods. If "creeping inflation" resumes its march during the next four years, depreciation allowances based on present costs will be much less adequate for future needs. This points up the importance of national economic policies to maintain price stability. Unless this can be maintained, industry's dollars will not go far enough to do the modernization job that is needed.

Plan '59 Carries On

Industry's drive to modernize is now well underway. It can make a key contribution to our national strength and prosperity in 1959 and the years ahead. But the biggest part of this job is before us. It is up to the policy makers—in both business and government—to see that the job is done.

This message was prepared by the McGraw-Hill Department of Economics as part of our company-wide effort to report on opportunities for modernization in industry. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or part of the text.

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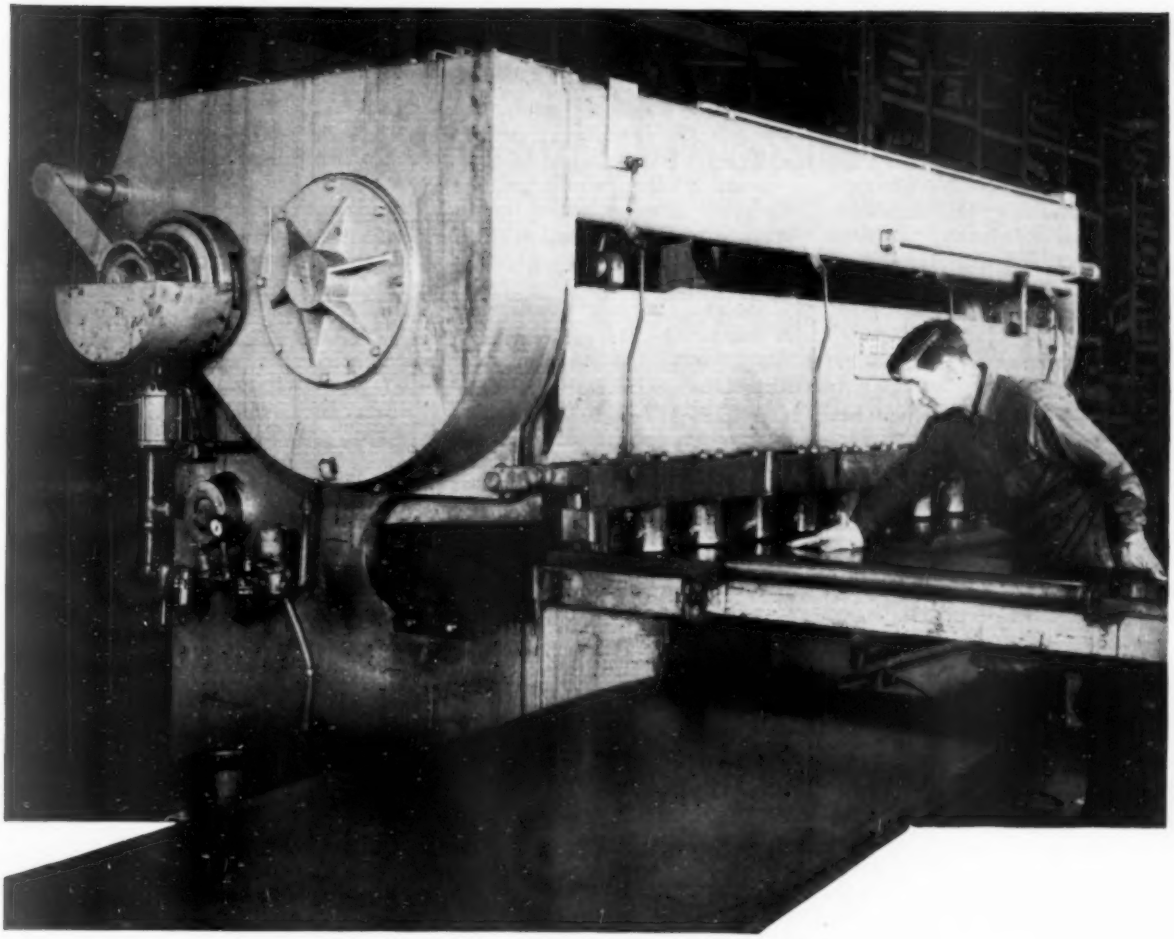

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FACTORY CATALOG NEWS

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1—Refractory Cements. This 20-page booklet is titled "Cements, Mortars, Coatings—Coordinated to the Furnaces of Industry." Explains how maintenance costs result from improperly matched mortars and bricks. *Mexico Refractories Co.*

2—Heat Exchangers. Specifications Manual (M-100) has 10 pages of technical data on double pipe and hairpin exchangers. Sections on design, materials, welding procedures, testing. Subassembly drawings. *Brown Fintube Co.*

3—Aridifier. Mechanical cleaner that removes 92% or more of oil, moisture, and dirt from compressed gas and air lines is the subject of an 8-pager (No. 459). Installation details, air flow charts, other info. *Logan Engineering Co.*

4—Water Treating Equipment. Here's a "guide to better water treatment" (No. 615, 24 pages). Covers newest manual and automatic zeolite water softeners, ion exchangers, filters, etc. Diagrams and photos. *Elgin Softener Corp.*

5—Clamps and Brackets. Labor- and cost-saving installation techniques for electronic, hydraulic, and mechanical harnessing problems are described in this 94-page manual (210G). Over 400 illustrations, visual index. *Ta Mfg. Corp.*

6—Welding System. Bulletin RD-400 (6 pages) discusses semi-automatic, shielded arc welding process that's independent of water cooling and gas shielding. Operates with a-c or d-c power. Entire unit is portable *Reid-Avery Co.*

7—Service Vehicles. Self-propelled scavengers and coolant servicers that cut machine tool downtime are covered in 4-page catalog (G-100). Sludge-Vac information is brought up-to-date. Specifications; cutaway and other photos. *Gorske Industrial Equipment.*

8—Electric Process Heaters. Catalog No. 60 (64 pages) describes company's complete line of heaters —over 15,000 types to fit most heating needs. Separate listing by product and alphabetical index. *Edwin L. Wiegand Co.*

9—Mechanics Tools. Complete line of hand tools and accessories for maintenance men, machinists, and automotive service mechanics is shown in 112-page catalog "W". Illustrations show tools, gages, test equipment. *Snap-On Tools Corp.*

10—Centralized Lubrication. "A Report to Management" is a 16-page booklet (No. 1-4428) that discusses application of centralized lubrication to reduce operation costs and improve production. Case histories. *Lincoln Engineering Co.*

AUXILIARY

11—Magnetic Brakes. Bulletin No. 5000 is an illustrated 4-pager that explains construction of brakes available in six sizes for maker's 600-series motors. Torque ratings, selection charts. *The Electric Controller & Mfg. Co.*

12—Air Starting Motors. This 24-page bulletin (Form 5094E) discusses trend toward cranking internal combustion engines with air power. Includes case histories, selection info, specs, mounting-dimension diagrams. *Ingersoll-Rand Co.*

13—Field Compressors. Design and operating features of packaged field compressors are set forth in Bulletin No. 158 (28 pages). Illustrates balanced/opposed compressor for vibrationless performance. Application photos. *Clark Bros. Co.*

14—Condensation Pumps. Here's a 6-page catalog (K-200) with ratings, capacities, pressure, and speeds for six types of condensation pumps for steam heating systems. Specs, installation diagrams, photos. *C. H. Wheeler Mfg. Co.*

15—Waste Treatment Equipment. Book 2617 titled "Water, Sewage and Industrial Waste Equipment" presents company's sanitary engineering equipment. Includes info on screens, mixers, and the like. Flow diagrams, photos. *Link-Belt Co.*

16—Compressors. Two catalogs: No. A56 (16 pages) describes 8 air-cooled compressors, 15 to 125 hp., 81- to 641-cfm. range; 12-page A73 covers heavy-duty compressors. Diagrams, photos. *Joy Mfg. Co.*

ELECTRICAL

17—Telephone Planning. This 22-page, 4-color illustrated booklet discusses importance of advance planning for telephone service. Covers location of telephone terminal room and use of conduit. *American Telephone & Telegraph Co.*

18—Limit Switches. Bulletin EM-5912 has 16 pages on heavy-duty water- and oil-tight switches in standard and neutral position, short travel, and push lever models. Lists specs, current ratings, other data. *The National Acme Co.*

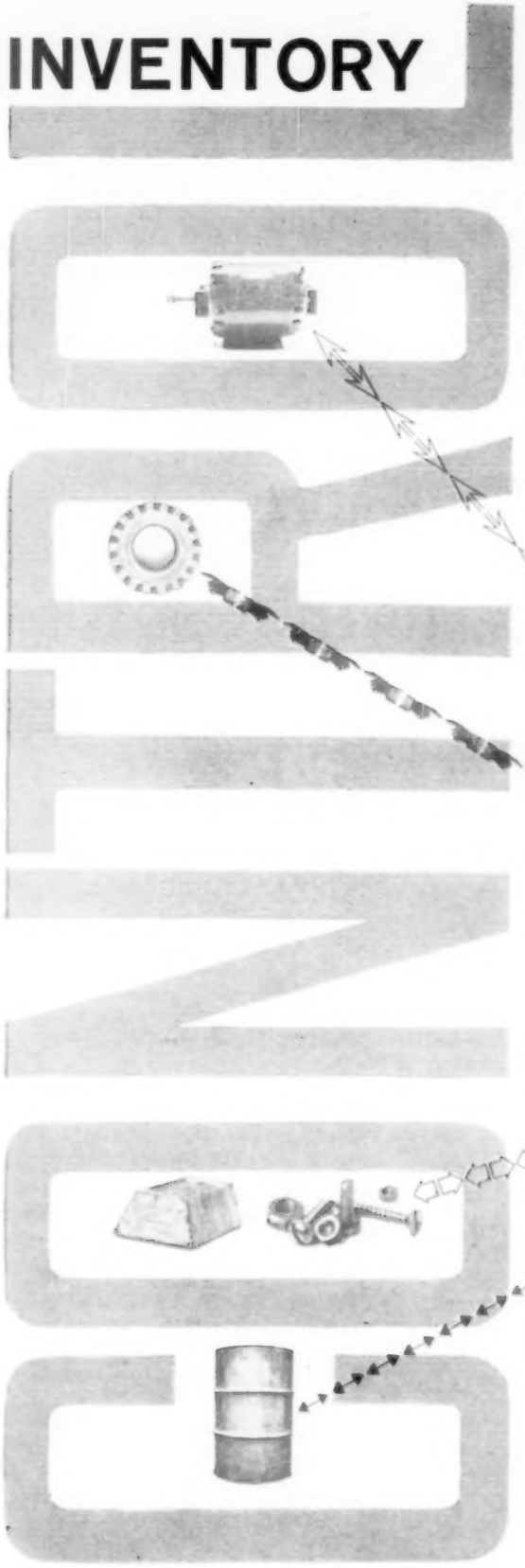
19—Lighting Units. Specs for incandescent and fluorescent lighting units are given in 44-page booklet (RLP-10). Discusses quality standards for lighting units that meet demand for better illumination. *RLM Standards Institute.*

20—Electric Motors. Fractional horsepower motors, blowers, and special products are described in Catalog No. 6773 (12 pages). Has dimensional diagrams, standard ratings. Shows shaded pole and split capacitor motors. *Redmond Co., Inc.*

21—Dielectric Test Set. Bulletin 22-5 (4 pages) discusses two models of new test instrument. These models make withstand and breakdown tests on insulation of equipment of 300, 600, 2500 volts and higher. *James G. Biddle Co.*

Turn the page

INVENTORY



PUT YOURSELF IN FULL COMMAND OF INVENTORY WITH IBM DATA PROCESSING

What do we have on hand? What are our immediate needs? What will we need in the future? When do we reorder?

With new IBM inventory control methods, you not only answer questions like these precisely, but you also keep inventories at optimum levels . . . reduce shortages . . . cut inventory carrying charges . . . get automatic calculation of materials requirements and ordering quantities.

Results of such control? One manufacturer cut a 24-day inventory reporting cycle down to 24 hours with an IBM 650. Another realized substantial savings by cutting his inventory investment **in half** with an IBM RAMAC® 305.

COMPLETE MANUFACTURING CONTROL

Not in inventory control alone—but in every area of manufacturing—from machine scheduling to market forecasting, from engineering planning to cost analysis, new IBM techniques are revolutionizing management control of manufacturing. In scores of companies, IBM data processing systems are supplying information once impossible to obtain . . . closing the time lag between fact and report . . . and reducing the over-all costs of production.

All these benefits can be brought to your business, too, with methods drawn from IBM's many years of experience.

For all the facts on IBM Data Processing, and complete details on IBM Inventory and Manufacturing Control Methods, call your local IBM representative.

IBM®
DATA PROCESSING

For more facts Circle 575 on Reader Service Card

22—Switches. Two catalogs: No. 159 (16 pages) is on subminiature switches—bases, terminals, circuit arrangements. No. 359 (28 pages) covers precision snap-acting switches for control and indicating circuits. *W. L. Maxson Corp.*

23—Voltage Regulators. Applications, selection data, dimensions, and connection diagrams are given in 60-pager (GEC-1450A). Ratings and data for single-phase, three-phase, liquid-filled, and 400-cycle units. *General Electric Co.*

MATERIAL HANDLING

24—Storage Racks. Here's a 24-page booklet (TSRE-4) that explains new concept of storage rack design. Gives step-by-step details for building pallet, drum, and other racks with ordinary pipe and universal clamp. *Tube-Strut Corp.*

25—Packaging Product. This 4-page manual contains info about pre-formed fiberboard wrap-around packaging material. Uses of Sus-Rap include block, space, and wrapping of fragile products. Easy to handle. *Vanant Co., Inc.*

26—Electric Hoists. Low headroom features of these hoists is pointed out in 36-page No. H-59. Gives details of five classes of monorail Lo-Heds with lifting capacities from ¼ to 12 tons. Diagrams, photos. *American Engineering Co.*

27—Trucks. Two catalogs: No. B612 describes heavy-duty electric fork trucks—the Titan series; capacities from 12,000 to 20,000 lb. No. 620 covers ram trucks with capacities from 20,000 to 80,000 lb. *The Elwell-Parker Electric Co.*

28—Conveyors. Catalog VB-95 (4 pages) discusses Vibra-Power oscillating conveyors for handling sand, scrap turnings, chips, castings, and the like. Includes capacity chart, application information, and photos. *Prab Conveyors, Inc.*

29—Plate Magnets. Bulletin 1074 has 4 pages on Indox V plate magnet models. Gives data on selecting magnet chutes, ducts, conveyors, other material handling equipment. Specs and dimensional drawings. *Stearns Magnetic Products.*

30—Cranes. Capacities, speeds, and other data on overhead electric traveling cranes are presented in an 8-pager (ED-205). Equipment includes crane controls, hoists, travelators, etc. Diagrams and photos. *Northern Engineering Works.*

31—Trucks. This 8-page bulletin answers questions about walkie or rider trucks: Which is better? When? Lists facts to keep in mind when you need a truck. Illustrates a few of over 200 standard models. *Automatic Transportation Co.*

32—Silent Hoist Crane. You may not want to hear a pin drop but you might be able to with this gasoline-operated rubber-tired continuous revolving crane. It's described in illustrated 4-pager (No. 99). *Silent Hoist & Crane Co., Inc.*

33—Fork Trucks. Seven bulletins and three sheets in one folder describe gas, diesel, LP-gas fork trucks, and accessories. Truck capacities range from 2000 to 10,000 lb. Operating and other data, helpful diagrams. *Allis-Chalmers.*

34—Vacuum Sheet Lifters. Suction-cup lifters for sheets of metal, plastic, and glass are illustrated in this 46-pager. Tells how to pick one-to-four suction cup lifters that handle up to 2000 lb. Photos, specs. *F. J. Littell Machine Co.*

VALVES AND FITTINGS

35—Butterfly Valves. Bulletin No. 583 (8-page foldout) has info on manual and automatic control and shut-off valves. Lists advantages. Tables of allowable pressure drop for seven classes of metal-seated valves. *W. S. Rockwell Co.*

36—Fittings and Flanges. Here's a 6-pager (TT944A) about light-wall stainless steel fittings for non-critical process piping. Shows how rolled-in flanged assemblies are made. Includes photos. *Tube Turns.*

37—Valves, Nozzle. Two catalogs: F-45 (4 pages) describes automatic shut-off aluminum nozzles in ¾- or 1-in. sizes; for use where liquid containers are hand-filled. J-170 (8 pages) covers sliding gate and plate control valves. *OPW-Jordan.*

38—Coated Valves. This 8-pager (V-614) discusses special-coated lubricated plug valves. Gives properties of coatings—K51 (Penton), Kanigen, and Teflon. Tables list applications. *Rockwell Mfg. Co.*

39—Relief Valves. It's fitting that they also give relief from "chattering" noises. Advantages are outlined in 16-page Mechanical Data Handbook. Illustrates squatty, gang, flanged, and other types. *Fulflo Specialties Co., Inc.*

PRODUCTION

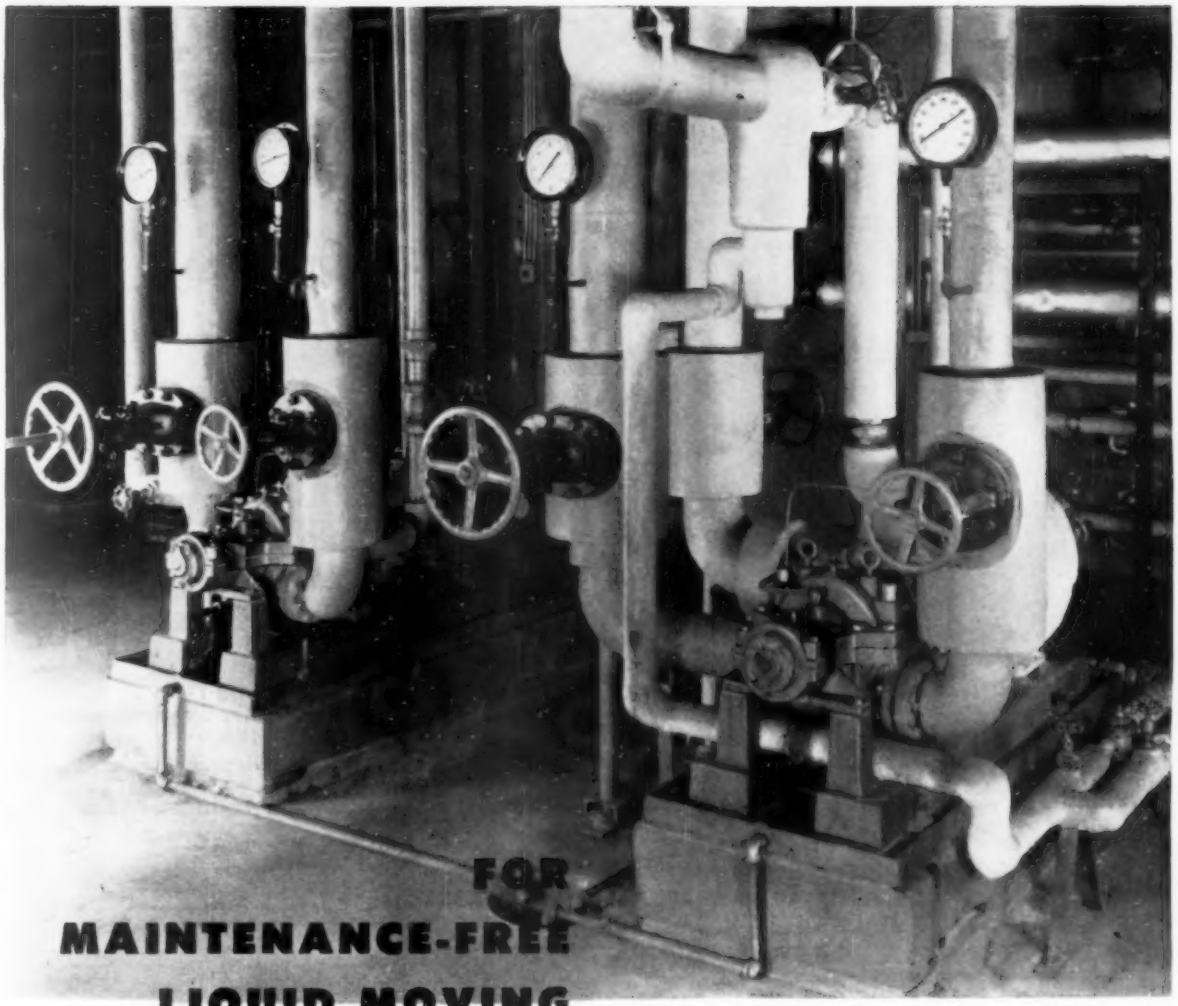
40—Finishing Equipment. Precision mechanical finishing and automatic finishing processes are outlined in 30-page illustrated catalog. Explains how radii can be broken and fatigue resistance of metal parts strengthened. *Roto-Finish Co.*

41—Counters. Here's a 4-page condensed catalog (Form 227687) that shows new high-speed electronic counters. Gives dimensions and application details. Also describes some of the instrument-type counter products. *Veeder-Root Inc.*

42—Taps. Whatever the need, this new tap "bible" (Catalog 802, 32 pages) on high-speed steel taps should have the answer. Selection data, class of fit, limit numbers, comprehensive drill diameter chart, other data. *Besly-Welles Corp.*

43—Ferrous Metal Flaw Detector. Ferroflux method of locating invisible defects in ferrous metal parts and assemblies is described in 4-pager (F-59). Portable magnetic inspection unit is shown "at work." *Ferro Machine & Tool Corp.*

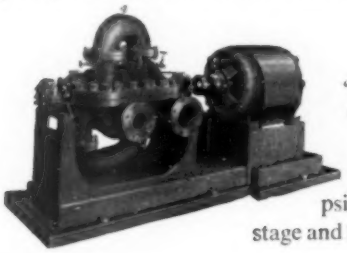
44—Gas Welding Equipment. Catalog GW2590 (32 pages) discusses oxyacetylene welding and cutting torches, regulators, other equipment



FOR MAINTENANCE-FREE LIQUID MOVING

"Buffalo" Class "RR" Pumps

For boiler feed and other high pressure, high temperature applications with clear water, "RR" Pumps deliver the utmost performance with an absolute minimum of maintenance. The unique "Buffalo" Class "RR" design is unsurpassed for consistent hydraulic balance. Rugged "Buffalo" construction features include efficient impellers — extra generous bearings and shafts — rigid casings with simply-formed passages to avoid friction losses — very deep stuffing boxes to accommodate more packing.



"Buffalo" Type "RR" Boiler Feed Pumps for pressures up to 500 psi. Available in two-stage and four-stage models.

These superior "Buffalo" design and construction features assure you of pumps that will stand up under continuous punishing service — that require practically no attention other than lubrication — that deliver more water at less cost for power.

The "Buffalo" Class "RR" Pump is your best buy for clear water service — hot or cold — against heads as high as 1500 feet — at capacities up to 900 gpm. Ask your nearby "Buffalo" engineering representative for full information, or write us for Bulletin 980-D.

"Buffalo" Pumps bring you the famous "Q" Factor — the built-in QUALITY that provides trouble-free satisfaction and long life.

BUFFALO PUMPS
Division of Buffalo Forge Co.

"Buffalo" PUMPS

471 Broadway • Buffalo, N. Y.
Canada Pumps, Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

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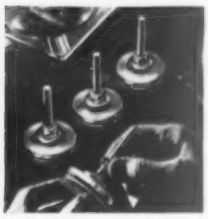
UNISORB LEVEL-RITE "200" MACHINE MOUNT

BUILT-IN VIBRATION CONTROL AND PRECISION LEVELING

Now . . . simple, fast and secure mounting — plus vibration control — for all types of light machinery and equipment with the new all-purpose UNISORB LEVEL-RITE® "200" MOUNT.



Look at these "200" features . . .

- Fast, simplified and precise leveling
- Free-floating screw post, compensates for uneven or pitched floors
- Safe, sure grip. Can be cemented if needed. No damage to floors, no bolting or lagging
- Exceptional vibration control — stops up to 85% of transmitted vibration
- Lowers noise level, reduces worker fatigue
- Machine can be moved at any time

Try this modern Unisorb Level-Rite "200" Mount now! Handles loadings up to 200 pounds per unit. Send for quantity prices and order form today.

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FE9-21

FACTORY / CATALOG NEWS

Begins on page 202

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and supplies. Includes design and performance info, drawings, photos. *Marquette Mfg. Co., Inc.*

45—Power Saw. Outstanding features of Model C-24 saw for heavy-duty cut-off work are subject of 12-pager (No. 59-12). Describes new chip disposal system, redesigned saw feed control mechanism, improved drive system. *The DoAll Co.*

46—Chucking Systems. Cost- and time-saving advantages of air-operated chucking equipment are pointed out in Bulletin PO-66D (8 pages). Includes construction details and installation instructions, drawings, photos. *The Cushman Chuck Co.*

47—Spot and Projection Welders. Bulletin 318-1 (8 pages) discusses air-operated, press-type, three-phase welding machines. Describes how three-phase principle solves power problems. *Sciaky Bros., Inc.*

48—Machine Tools. A new 17-in. drill press, a 2½-in. belt grinder, and a 20-in. band saw and butt welder top the list of light-heavyweight tools described in WT-50-9. Photos and drawings illustrate this 48-pager. *Rockwell Mfg. Co.*

49—Weighing Systems. "Plan-It-Yourself" is a feature of 8-page No. 591 on packaged hydraulic weighing systems with capacities to 5000 lb. Illustrations help you pick the one needed to solve your weighing problem. *The A. H. Emery Co.*

BUILDINGS

50—Metal Windows. This 16-pager (No. 17A) describes custom-made aluminum, bronze, and stainless steel windows. Types include reversible, sliding, projected, awning, single and double hung, and other styles. *Albro Metal Products Corp.*

51—Luminous Ceilings. Ten diffuser panels for ceilings are shown and discussed in 4-page bulletin.

Turn the page

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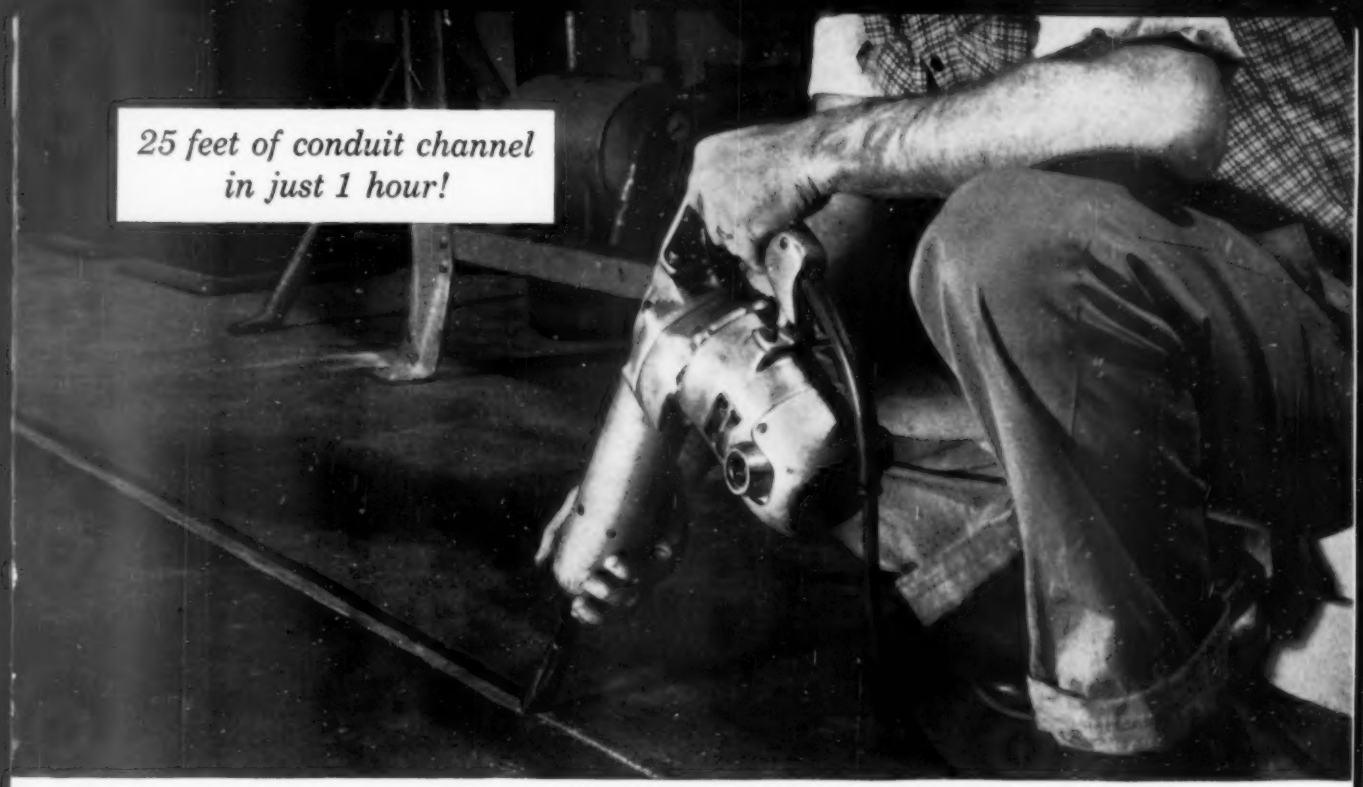
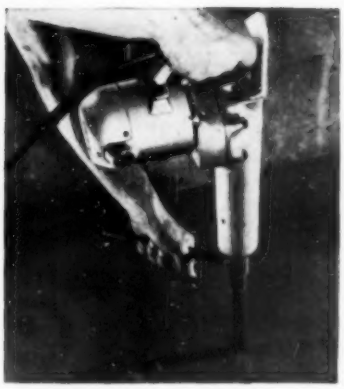


Look what Black & Decker's 1⅛" Hammer can do for you!

BREAKING holes through concrete or brick; demolition work goes easier with bull point tool.



INSTALLING electric outlets in concrete is a cinch with a B&D Hammer.

TRIMMING excess metal or scaling after the job's done goes fast and easy with cold chisel.

MOUNTING electric signs, switchgear, etc. is fast work with powerful Hammer and star drill.

2,200 cutting blows a minute speed up electrical jobs

Here's the tool that helps you slash preparation time laying conduit in concrete floors and in scores of other jobs! Rugged Black & Decker Electric Hammers are *power*-packed to deliver thousands of hard, rapid, cutting blows to send your man-hours tumbling; output per worker climbing.

See for yourself what the B&D 1⅛" Hammer can do for you in drilling, digging, piercing, breaking, chiselling and dozens of other operations. Mail coupon for free demonstration or additional information. THE BLACK & DECKER MFG. CO., Dept. 0708, Towson 4, Md. (In Canada: Brockville, Ontario.)

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Leading Distributors Everywhere Sell

B&D Black & Decker®

Quality Electric Tools . . . Power-built for top performance

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☐ Please arrange a free demonstration of your 1⅛" Hammer
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LOW COST PROTECTION

What's more economical—more practical—than a paper bag? Or more *versatile?* They're proving it every day for manufacturers of items ranging from fittings . . . to furniture parts.

Bower Roller Bearing Division of Detroit, Michigan, for example, formerly packed their bearings in chipboard tubes. Now (see above) the company uses paper bags. Result? Impressive savings in packaging materials. Reduced warehousing costs. Faster handling and packaging speeds.

Why not look into the many advantages of putting *your* products in low cost paper bags. Write for free booklet FM-111.

Commercial Packaging

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FACTORY / CATALOG NEWS

Begins on page 202

For more about these items, circle item numbers on Reader Service Card next to back cover.

Panels furnish restful illumination free from glare. Table of lighting elements, installation info. *Luminous Ceilings, Inc.*

52—Doors. Here's a 16-page catalog (16i/Ba) with details on overhead doors and electric door controls. Gives info and illustrations for panel doors, radio and special controls, special features, and accessories. *Barber-Colman Co.*

53—Dust and Fume Control. Sixty plant dust control installations are illustrated in this 52-page catalog. Shows typical industry uses of dust collectors, air cleaners, filters, and ovens. Includes specs. *The Kirk & Blum Mfg. Co.*

MECHANICAL

54—Power Transmission. Bulletin A706 (8 pages) briefly reviews maker's line of power transmission machinery. Discusses two new products—Flexidyne dry fluid drives and flexible cushion couplings. Sizes, photos. *Dodge Mfg. Corp.*

55—Sprockets, Roller Chains. Here's an 88-page catalog (No. 60) that points out advantages of roller chain drives. Describes attachments for chains and 1300 stock sprockets. Chain length conversion table. *Cullman Wheel Co.*

56—Roller Bearings. Their construction, dimensions, capacities, housing, and tolerance fits are given in 48-page Reference Manual (M59). Includes staggered roller bearings, cam followers, etc. *Orange Roller Bearing Co.*

57—Poly-V "J" Drive. This 4-pager (M142) discusses new drive for small diameter sheaves and short centers. Quiet-running, vibration free, good resistance to heat and oil. *Raybestos-Manhattan, Inc.*

58—Roller Bearings. Here's a handy reference (PL-559) to maker's nine principal lines of roller bear-

Meet Special Lighting Problems in Special Ways...

with STANDARD SYLVANIA FIXTURES

Every so often a lighting situation develops that just cannot be answered by conventional methods.

Take the installation shown above as an example. Here is a shop where precision machine work is performed daily. Lighting requirements call for effective vertical illumination on the key surfaces of intricate tools as well as even, high level horizontal lighting. Reflected glare from the polished surfaces must be kept at a minimum and shadows should be practically non-existent.

To meet the lighting requirements under these challenging circumstances, Sylvania engineers recommended a louvered fixture with 35° x 45° shielding and plenty of up-light to achieve two purposes . . . to eliminate unsatisfactory contrast between the fixtures and the ceiling background; and to achieve effective uniformity of illumination throughout the entire area. Very high output (1500 ma.) lamps were used to produce the 150 foot-candle level desired. And a special grid-type layout was used to provide lighting on vertical surfaces from all directions.

The result, as shown above, is uniform, high level lighting where workers perform efficiently in complete comfort. Production efficiency has increased and rejected parts have been reduced considerably.

This illustrates why it pays to check with Sylvania when a lighting problem confronts you. Sylvania's complete line of fluorescent fixtures . . . both industrial and commercial . . . gives complete freedom in selecting the exact fixture that will solve your problem best.

From now on, take your lighting problems to Sylvania . . . where good lighting is a science.

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GENERAL SYSTEM

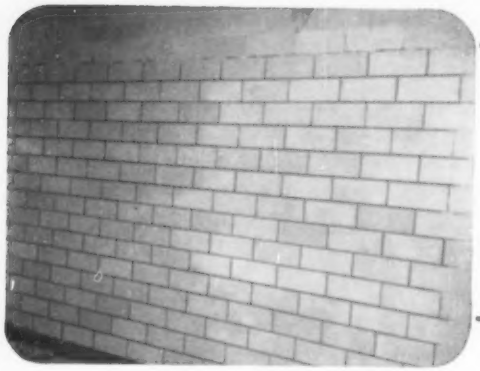
FLUORESCENT LIGHTING FIXTURES AND SYSTEMS • BEST FIXTURE VALUE IN EVERY PRICE RANGE

QUICK, economical, durable repairs for tile walls with D-J MORTAR

Nonmetallic, No Oxidation, No Unsightly Stains . . .

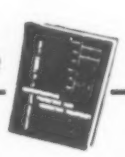
Loose mortar has been removed. D-J Mortar is simply brushed over entire ceramic tile wall, filling all voids, shrinkage cracks, etc.

While D-J Mortar is still damp, excess is wiped off tile surface, leaving all joints, cracks and holes completely repointed.



A costly time consuming repointing job has been reduced to the economy and speed of a single brush coat!

Just off the press, write for our New 20 page brochure



Standard Dry Wall Products Inc.
BOX X, NEW EAGLE, PA.

For more about these items, circle item numbers on Reader Service Card next to back cover.

ings. Has specs, sizes, and application data for Air-Rol, precision radial, Tru-Rol, and other bearings. *Rollway Bearing Co.*

59—Skew-Axis Gears. This 36-page engineering manual (AD-32) shows how to use Spiroid gearing systems for medium-to-high reduction ratios. Includes design and dimensional data, specs, applications, selection info. *Illinois Tool Works.*

60—Indexing Mechanisms. Catalog No. 108 shows how to choose roller-gear drive indexing devices for production machinery. Explains standard and custom installations in 24 pages. Drawings, specs. *Ferguson Machine Corp. of Ind.*

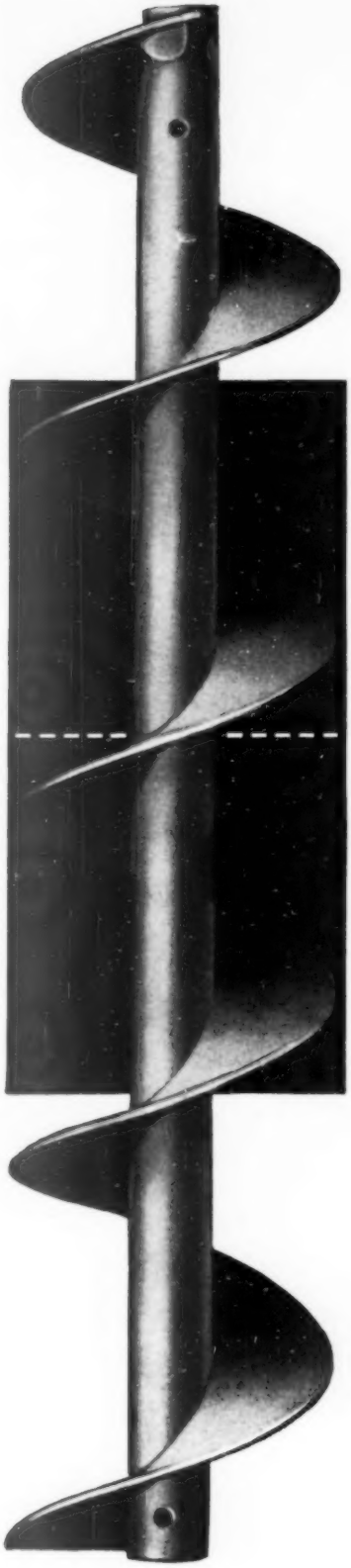
INSTRUMENTS AND CONTROLS

61—Recording Systems. Here's a 16-pager (No. 1100) on advantages of maker's direct writing recorder and other precision recording instruments. Photos of conditioner amplifiers, oscillographs, and other units. *Brush Instruments.*

62—Recorders, Controllers. Catalog GEA-6887 (12 pages) covers continuous self-standardizing strip-chart recorders and recording controllers for measuring electrical and process variables. Specs, application data. *General Electric Co.*

63—Recording Device. This 8-page catalog (35-1541) describes single-unit, battery-operated device that measures, converts, and records analog values in digital binary-decimal punched-tape form. Includes specifications, application information. *Fischer & Porter Co.*

64—Signaling Controller. An electronic off-on potentiometer type controller is presented in Catalog 51-4 (4 pages). Includes specs, diagram of two-position controller; photograph shows inside view of controller. *Thermo Electric Co., Inc.*



LINK-BELT is

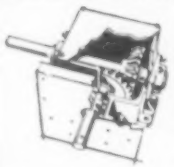
YOUR ONE SOURCE FOR ALL SCREW CONVEYOR NEEDS

your only source for many

QUIK-LINK CONVEYOR SCREW. For ease in removal of conveyor section without disturbing other components. Can be furnished on Helicoid and Sectional flight conveyors.

HANGERS have wide top bar with slotted bolt holes for easy assembly and alignment. Available with self-aligning ball bearing or with sleeve bearing in babbitt, hard iron, bronze or oil impregnated wood.

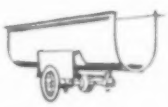
TROUGH ENDS of heavy steel plate are flanged at top and bottom. Furnished with babbitted, bronze or single or double ball bearing flange block, with or without trough end seal. Blocks are interchangeable.



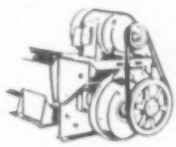
COUNTERSHAFT ENDS with ball and roller bearings or babbitted bearings, for right angle drive applications — common drive for two conveyors at right angles.

TROUGHS are accurately formed and jig-assembled. Steel angles securely welded to trough plate form top flanges. Can be made of stainless steel or other special metals to suit specific requirements.

SEMI-FLANGED, SPRING CLAMP COVERS are more rigid, easier to handle and form a tighter seal than plain type cover. Spring clamps are attached to cover—simplifies installation.



DISCHARGE SPOUTS AND GATES can be located anywhere along length of conveyor trough. Gates can be flat or curved —hand or rack-and-pinion operated.



DRIVES. Link-Belt shaft-mounted speed reducers are simple, compact — can be mounted directly on trough end plate. Motogears and Gearmotors with roller chain drives can also be furnished.

With seventeen basic screw designs, and a full line of components, Link-Belt can furnish anything you need from a single component to a complete line of screw conveyor.

As the foremost producer in this field, Link-Belt offers a range of new product improvements for profitable operation. Quik-Link conveyor screws, hangers, trough ends with ball or sleeve bearings, jig-welded troughs with new semi-flanged spring clamp covers—these and many more are cutting power demands and maintenance costs.

If you have bulk materials to be handled, it will pay you to look into the Link-Belt screw conveyor line. All components are available from stock. Call or write your nearest Link-Belt office or authorized stock-carrying distributor for Book 2989.

LINK-BELT

SCREW CONVEYOR

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,238

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IN STOCK NOW! THE NEW "M" FRAME BREAKER THAT BROKE THE 800 amp SIZE BARRIER!

Federal Pacific takes a big stride forward with the industry's smallest 800 amp breaker! Now one breaker replaces ordinary "K" breakers . . . replaces "KL" breakers . . . replaces "LM" breakers. No deeper, no taller, no wider than conventional 225 amp "K" frame breakers, the new "M" meets all application requirements from 125 through 800 amps . . . reduces inventory investment by ⅓ . . . occupies less space in switchboards and control centers . . . permits use of smaller individual enclosures and panelboards. Write for detailed bulletin #1416, Federal Pacific Electric Company, General Offices: Department 329, Newark 1, New Jersey.

PACKED WITH FEATURES: ■ DUAL MECHANISM for higher, interrupting ability. ■ TEASE-PROOF "Quick-Make, Quick-Break" operation for long life. ■ FACTORY-SEALED adjustable Thermal-Magnetic Interchangeable Trip prevents tampering. ■ INSTANTANEOUS deionization arc quenching assures longer contact life. ■ UNIQUE triple lug design permits wide selection of cable sizes. ■ SILVER-TUNGSTEN contacts provide high conductivity, low contact resistance. ■ RUGGED construction, high dielectric molded phenolic case. ■ UL APPROVED. Conforms to Federal Specification W-P 131a, Amendment 2 as Class D and Class E breaker. ■ INTERRUPTING RATINGS: 50,000 amps at 240v a-c, 35,000 amps at 480v a-c and 25,000 amps at 600v a-c.

FPE **FEDERAL PACIFIC ELECTRIC COMPANY**

The Best in Electrical Distribution and Control Equipment

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FACTORY MATERIALS NEWS

For more about these items, circle numbers on Reader Service Card next to back cover.

Filters Kill Germs, Trap Dirt

These air filters really battle germs. New Permachem-treated filters trap and destroy 90 to 98% of airborne bacteria and fungi. The dry filter media is made of cellulose acetate fibers formed into a loose batt which "contains millions of dirt traps."

No oil is used on these filters. Thus the chore of cleaning the duct-work is eliminated.

Filters are available to fit all air heating and cooling systems. Where rooms do not have such equipment, filters have been adapted for use in air recirculators. Present filters come in more than 300 sizes and types for all possible applications.

New designs in air-moving and ventilating systems are expected as different ways of using this germ-killing filter gradually develop. *Fram Corp.* (Circle 251).

Now You Can "Scotch" Tape Pipe Joints

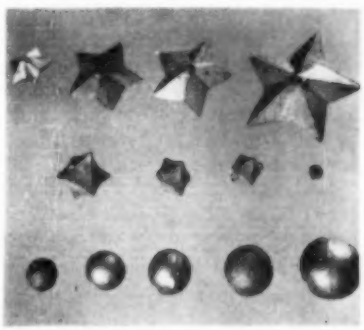
It's easy to seal and permanently lubricate pipe joints with this new chemically inert tape that conforms to all types of pipe threads.

This "Scotch" brand sealant tape, No. 547, made with Teflon, withstands processing temperatures from the liquid-oxygen range through that of superheated steam. Although it's non-adhesive, the tape sticks to its own glossy surface. Single wrapping gives full protection. Excess tape can be torn off easily. Tape is white; comes in 36-yd. rolls, ¼- to 8-in. wide. *Minnesota Mining and Mfg. Co.* (Circle 252).

253—Steam Cleaning Liquid, for removal of heavy deposits from wheels of fork and hand trucks, is so safe no goggles or gloves need be worn. The material, F.O.-287, also removes soils from painted and unpainted surfaces. In 5-, 30- and 55-gal. containers. *Fine Organics, Inc.*

254—Seamless Polyethylene Sheet is 40-ft. wide, 0.006-in. thick, in standard rolls 100-ft. long. Ger-Pak's seamless construction and durability make it suitable for enclosing or covering large structures and areas. Comes in natural-clear or black. *Studebaker-Packard Corp.*

255—Protective Coating that's also skidproof consists of two components—one includes the thermosetting resin base, the other contains the reactor. This tough plastic film —PG-1013—adheres to steel as well as concrete. Gray, red, green. *Permagile Corp. of America.*



New Stars and Balls

These five- and six-point stars and grinding balls are not for decoration. Stars are for cleaning, deburring, and burnishing ferrous and nonferrous metallic castings, forgings, weldments. Balls, in ¾- to 1¼-in. sizes, are for burnishing, grinding, or pulverizing cement, metallic ores, minerals, sand. Available for special applications. *Quincy Foundry, Inc.* (Circle 256).

Turn the page

For more about these items, circle numbers on Reader Service Card next to back cover.

257—Pipe Insulation, called Unarco (U-200), is a new urethane foam insulating material for use at temperatures ranging from −300 F. to +220 F. Has excellent resistance to water and vapor. Can be cut and applied with standard tools. *Union Asbestos & Rubber Co.*

258—Solution known as Fluorobond makes fluorocarbons bondable without affecting electrical properties. Materials such as Teflon or Kel-F can be treated in a maximum of 15 sec. by either dipping, brushing, or spraying, with no adverse effects. *The Joclin Mfg. Co.*

259—Fire-Retardant Paint, for use on highly combustible interior surfaces, is economical answer to elimination of fire hazards in buildings. On exposure to heat or fire, paint foams up, forming a blister that prevents flame spread. UL-tested. *Albi Mfg. Co., Inc.*

260—Fluorescent Paints that will not blend with surrounding background colors act as safety reminders when painted on danger areas. Called Hi-Viz, coatings come in nine brilliant colors. Purple is color suggested for radiation hazard markings. *Lawter Chemicals, Inc.*

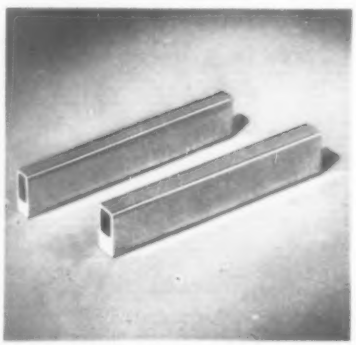
261—Pipe Insulation Systems feature structural concrete base pads for alignment and stability. The three applications of vermiculite concrete ("CTC," "Z-Crete," and "b-t-u") are fabricated in the field for ease of installation and flexibility. *Concrete Thermal Casings, Inc.*

262—Cement Patch is a fast self-curing, easy-to-mix general purpose compound for repairing everything from a crack to a large hole in concrete or masonry. This compound requires no primer. It's available in complete packages of 5, 10, and 40 lb. *The Flintkote Co.*

263—Aluminum Bronze Die Alloy, known as DiBronze, is a new material for drawing and forming stainless steel and other clean metals. Use of DiBronze is said to offer longer die life, lower finishing costs, and less downtime for redressing dies. *Ampco Metal, Inc.*

264—Disinfectant - Deodorizer, called Fyte, sprayed on any surface will dry quickly leaving a germ-killing and odor-free surface. Kills bacteria, fungus, and all common types of disease germs. Formula mixture and balance remain constant in aerosol cans. *Hysan Products Co.*

265—Molding Compound, DPD-7365, is first of a series of polyethylene molding materials based on this copolymer. Among other advances the new compound is said to have outstanding low-temperature toughness qualities, excellent surface gloss. *Union Carbide Plastics Co.*



266—Off-Center Copper Tube, for use in electrical and induction heating applications, is a new shape that reduces handling and material and scrap costs. Improves efficiency of inductor coils. In square and rectangular sizes to 3 in. *Phelps Dodge Copper Products Corp.*

MATERIALS LITERATURE

267—Cellophane Bundling. This 12-pager sets forth the advantages of cellophane over bulky wrapping materials. Termed the "newest concept in redistribution packaging," it illustrates many applications. *American Viscose Corp.*

268—Aluminum Finishes. Theory and method facts on finishing operations are given in 28-page handbook, "Finishes for Aluminum." Lists five finishes, and tells how to select the best one for specific applications. *Reynolds Metals Co.*

269—Movable Partitions. If you want partitions that can be moved from here to there, this 24-page catalog (MP-1) tells you how. Describes building of partitions, types of panels available, basic parts. *Penn Metal Co., Inc.*

270—Container Coatings. Here's a loose-leaf folder with four pages of data on lining materials. The coatings are available in three custom-formulated consistencies, and come either clear or pigmented. *Lining Engineering Corp.*

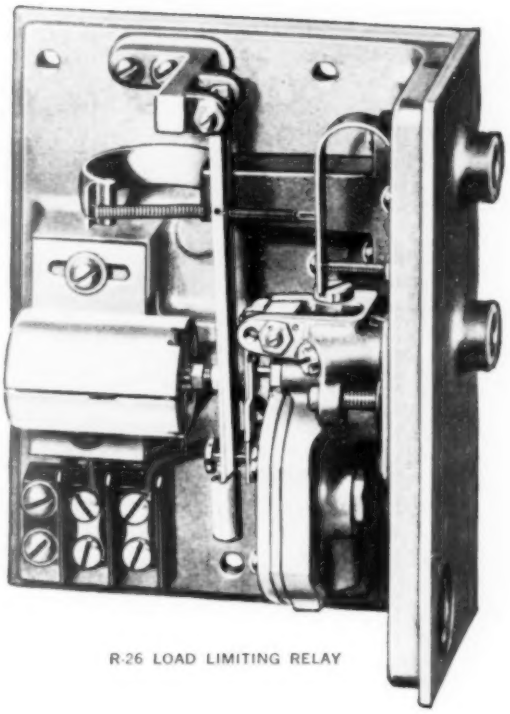
271—Ceramic Fiber Materials. Fiberfrax insulating materials that withstand temperatures up to 2300 F. are described in 14 technical data sheets. Each sheet deals with a different form or type of the material. *The Carborundum Co.*

272—Fatigue-Resistant Alloy. This 28-page handbook gives facts on company's alloy called Elgiloy. Describes properties of product and applications; supplies corrosion-resistance data, curves, and photos. *Elgin National Watch Co.*

273—Cushioning Material. This large 8-pager tells all about Edg-Pak, a self-gripping cushioning and packaging product for protecting edges. Photos show uses of material in nesting, packaging, edge protection. *Flex-O-Lators, Inc.*

NEW JOHNSON R-26 LOAD LIMITING RELAY

FOR POSITIVE PROTECTION AGAINST MOTOR OVERLOADING



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- A superior new limiting device for use with pneumatic control systems. Designed for application to all makes of centrifugal refrigeration compressors and to pumps, fans, and electric heating systems.
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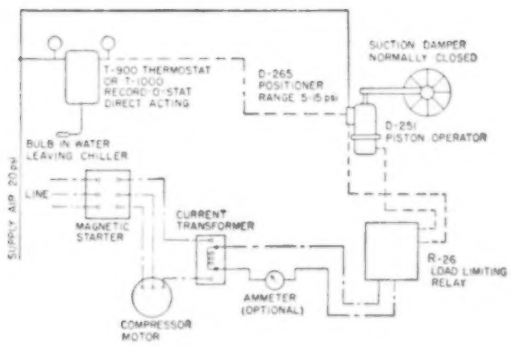
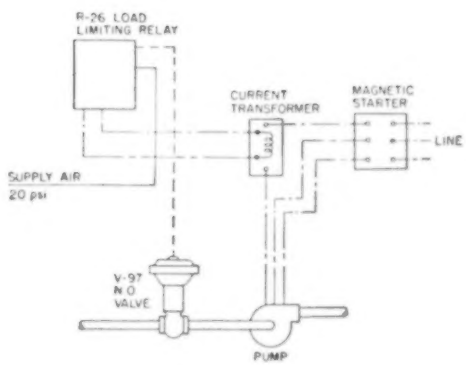
For full information, write for Bulletin R-26, Johnson Service Company, Milwaukee 1, Wis.



Load Limiting Relay used with piston operator for overload protection of centrifugal refrigeration compressor.



Load Limiting Relay applied to pump installation.

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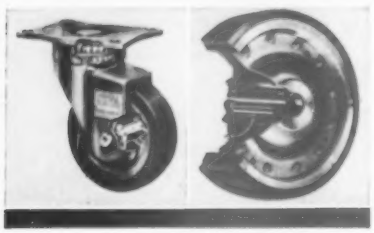

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Personnel Book for Plant Managers

Here's a book on personnel administration written not for the specialist, but for the general management man. James Taylor, formerly Director of Industrial Relations for Procter & Gamble, has produced this much needed work. It should mark a new beginning for the arts and sciences of personnel management.

Taylor has written this authoritative text, *Personnel Administration —Evaluation and Executive Control*, for two audiences. His principal audience is the manager with general responsibility for plant and company operation. His secondary target is the personnel specialist. Taylor reaches both groups adroitly, without conflict or confusion.

To achieve his objective, the author follows a simple, helpful pattern. First, he defines his subject and analyzes it in penetrating fashion. Then he tells how you can evaluate the success with which the personnel problem is being handled in your plant. Finally, he offers suggestions for remedying or improving your situation.

For the reader who wishes to get personnel administration into perspective, this book is especially rewarding. Taylor's opinions and his advice are fresh and perceptive. He is a man who is willing to take a position. And his position is one based upon outstanding experience in the field.

For example, take a matter like man-boss relationships. Here is a sampling of Taylor's advice:

"Remember, this is an on-the-job relationship. There is a clear and yet subtle difference between an association developed on the golf course and the connection we would like to see burgeon in the work situation. The reference point is different, and the values are distinct. It is one thing to get close on the kind of golf ball you use and quite another matter to have a cordial relationship when you are discussing the individual's recent questionable performance.

"Finally, keep your eye on the ball. The prime purpose of creating and maintaining good man-boss relationships is the improvment of the *work* relationships."

Or listen to this comment on collective bargaining:

"We assume that when you sign a contract you mean to live up to it, and that you will take all necessary steps, and then some, to make certain that your managers respect the words and spirit of a document to which you have signed your name. No manager in his right mind would negotiate a clause that he knew had one legally enforceable meaning to him and another unenforceable meaning to his people. Simple business ethics, if nothing else, requires a meeting of the minds, an understanding that there will be no sharp writing, and a definite system to make sure there is no sharpshooting by your managers."

And hear this on relationships with union representatives:

"The evidence is that patent close friendship, real or pretended, with outside union officials is a tender subject. Regardless of how a personal relationship is maintained, of how open and aboveboard it may actually be, there will always be the suspicion by others (and also, perhaps, by the "friends" themselves) that one or both is using the other. Employees who have witnessed a battle at negotiation time, or maybe a bitter walkout, will not always understand the objectivity that permits two foes to lay down their arms and drink a cup together. Sides have been chosen, and you stay on your own side."

Right down the line, plant management men will find in this book practical, specific, and intelligent help on such problems as management recruiting, training, appraisal, and development; compensation of non-exempt, supervisory, and executive personnel; personnel plans, policies, and fringe benefits; manager-employee and company-union relations; written personnel policies and role of the personnel man.

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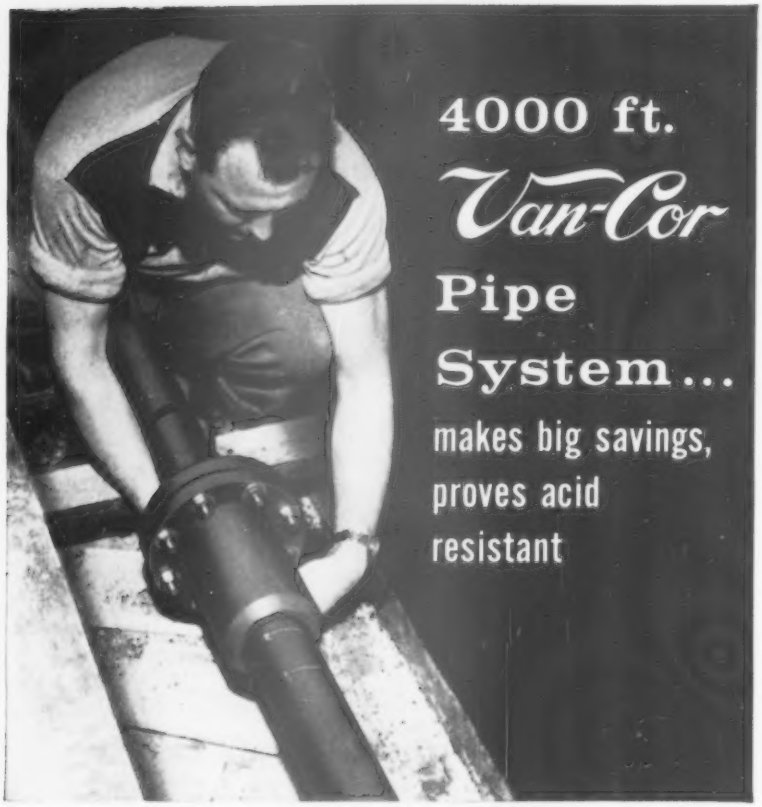

At the Allentown (Pa.) Works of the Western Electric Co., the entire waste acid disposal system in the recent addition consists of Van-Cor rigid PVC pipe and fittings.

HOW COSTS WERE CUT. Initial price of Van-Cor was ⅓ that of comparable cast iron alloy pipe. On a 6" line, labor costs were estimated at 29¢ per foot of run—about half that of metallic pipe. Also, because Van-Cor has only 1/10 the weight, no mechanized handling equipment was needed. Available in 10 or 20 ft. lengths, Van-Cor requires fewer joints, and eliminates the breakage problem.

CORROSION LICKED. Van-Cor pipe was used because "corrosion resistant" cast metallic pipe had performed short of expectations in an adjacent building. After 1½ years service, the Van-Cor system is in excellent shape, unaffected by such acids as hydrofluoric, hydrochloric, sulphuric, nitric and many plating solutions.

Investigate Van-Cor Pipe, Fittings, Valves, Electrical Conduit, and Fabrications . . .

Write for Catalog and Name of Nearest Distributor

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FACTORY / BOOKS
Begins on page 216

FACTORY's editors, to the personnel book of the decade.

Personnel Administration: Evaluation and Executive Control, by James H. Taylor, McGraw-Hill Book Co., 330 West 42nd St., New York 36. 326 pages, $7.

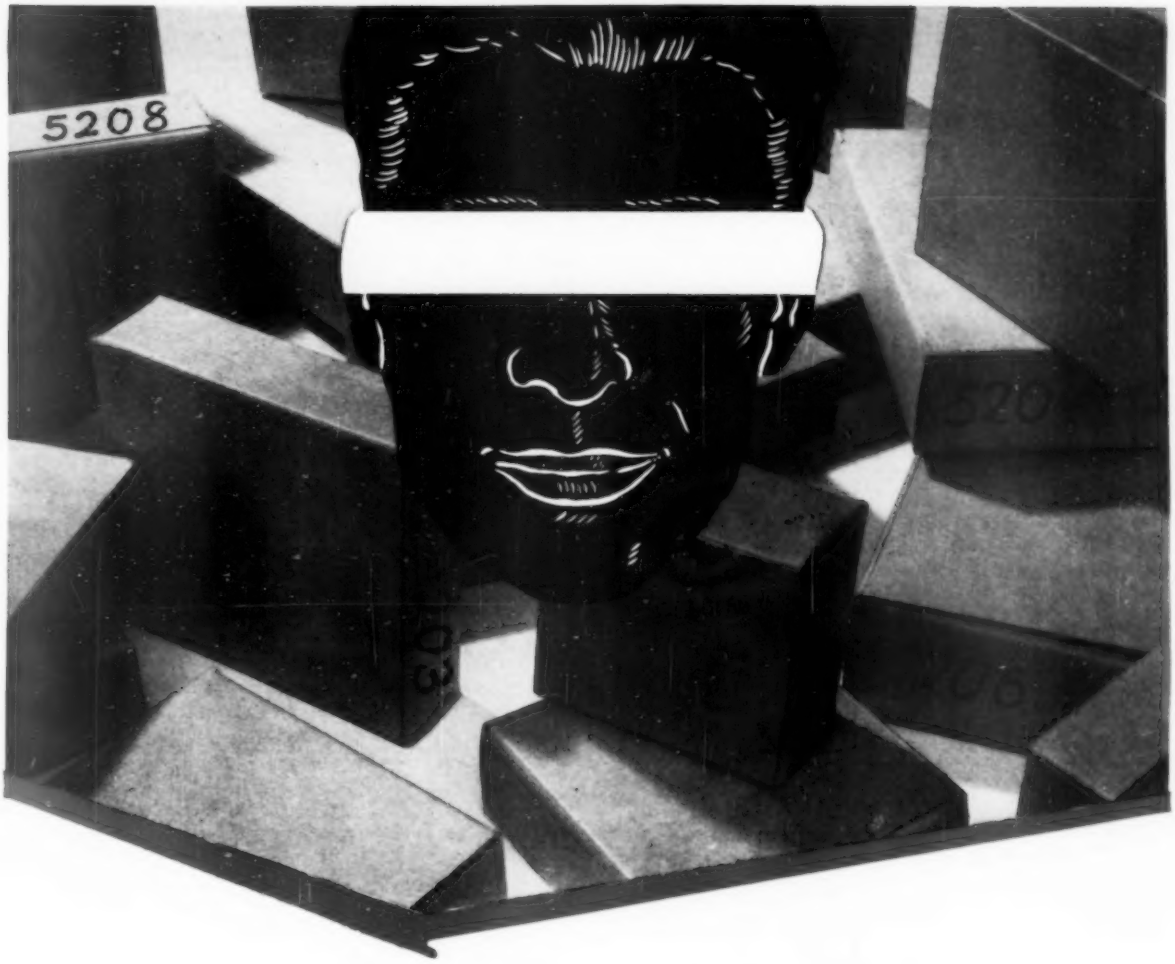
Techniques of Plant Maintenance and Engineering—1959. Complete rundown on papers presented at the Plant Maintenance and Engineering Conference in Cleveland last January. Includes answers to over 1000 questions submitted by engineers attending, plus 70 charts, graphs, diagrams. Will make a welcome addition to any plant engineer's reference library. *Published by Clapp & Poliak, Inc., 341 Madison Ave., New York 17. 266 pages. $10.*

Work Measurement in the Office. Comprehensive study on how to set up and carry out an office work measurement program for improving methods and controlling costs. Describes in detail and evaluates six different techniques for measuring office work. *By Elmer V. Grillo and C. J. Berg, Jr. McGraw-Hill Book Co., 330 West 42nd St., New York 36. 200 pages. $5.75.*

Operations Research—Methods and Problems. Concentrates on how to solve typical problems with operations research. Starts with a problem-centered review of probability and statistics, follows with chapters on inventory, waiting lines, game theory, linear programing, sequencing, dynamic programing. *By Maurice Sasieni, Arthur Yaspan, and Lawrence Friedman. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. 322 pages. $10.25.*

Executive Selection: How Psychologists Can Help—Here's a timely report on the advantages and pitfalls of using psychological methods to select executive talent. Tells how the psychologist can help, but makes it clear that final selection is the responsibility of management. Prepared by a group of Harvard Business School graduate students. *Published by Management Reports, Box 136, Cambridge 38, Mass. 127 pages. $12.50.*

For more facts Circle 587 on Reader Service Card



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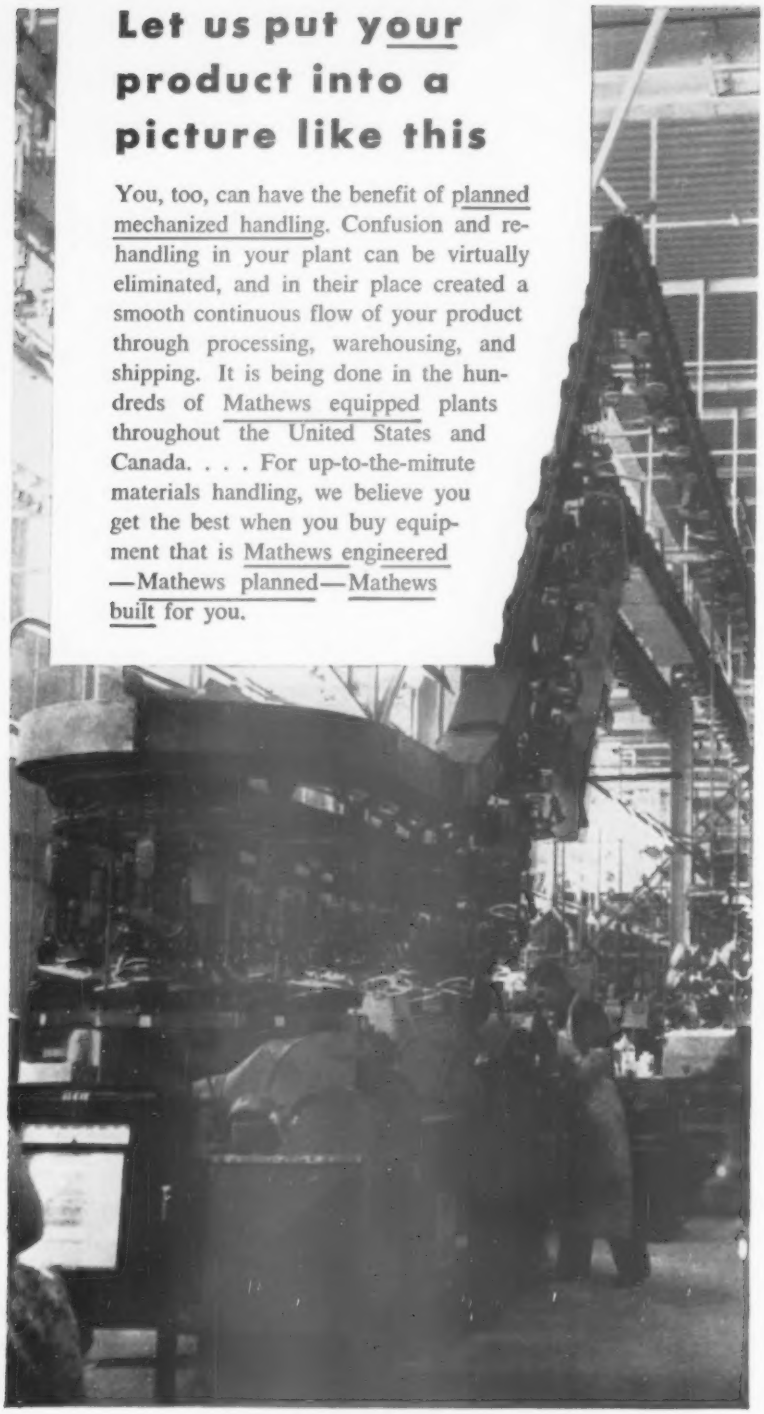

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Henry Strauss Distributing Corp., 31 West 53rd St., New York 19.

New Fastening Methods depicts the assembly line concept of fastener application. Film features a fastener that can be applied to railroad cars, truck trailers, steel and aluminum buildings, aircraft and missiles. Use of time-lapse technique of photography shows condition of the collar at various stages during the fastener installation. 16mm, color, 13 min. Write to:

Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7.

Motors in the Making shows the manufacture of electric motors from frame fabrication to assembly, testing, and packing for shipment. Film describes the testing of materials, tools, and instruments used in various operations. 16mm, sound, color, 31 min. For loan, write:

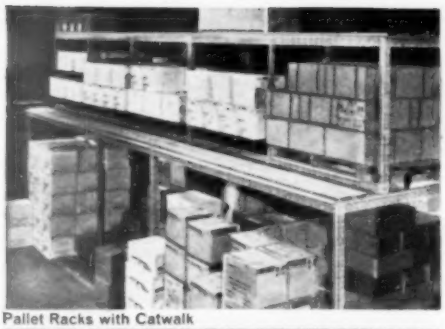
Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14, Mo.

Cat No. 14 is not one of our feline friends but a dramatization of the kinds of jobs this 150-hp., 30,000-lb. motor grader can do. Film points out new features of the No. 14 that make it big in power and in production. 16mm, sound, color, 8 min. Write to:

Caterpillar Tractor Co., Peoria.

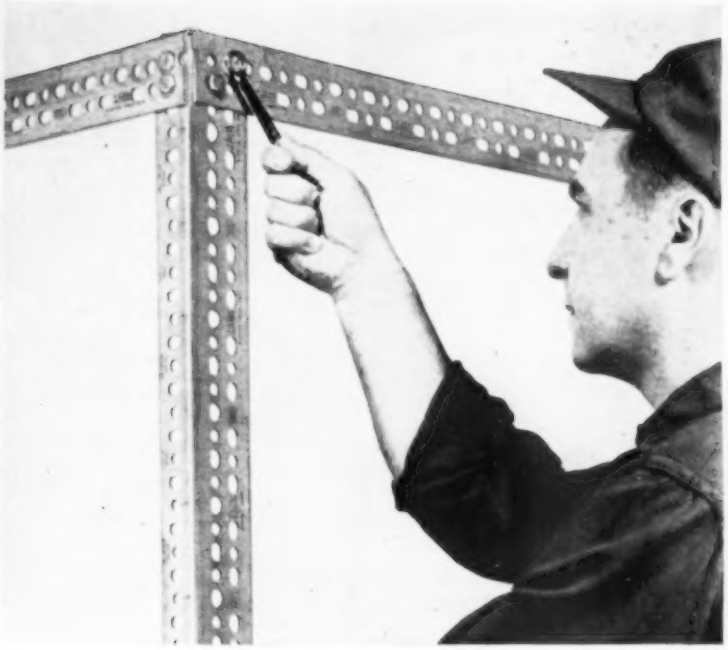
Space, Time and Steel demonstrates the use of steel in the off-site fabrication of basic building units. Film shows how units are built, packaged complete with fasteners and hardware, and shipped to construction sites. 16mm, sound, color, 24 min. For loan, write:

Modern Talking Picture Service, 3 East 54th St., New York 22.

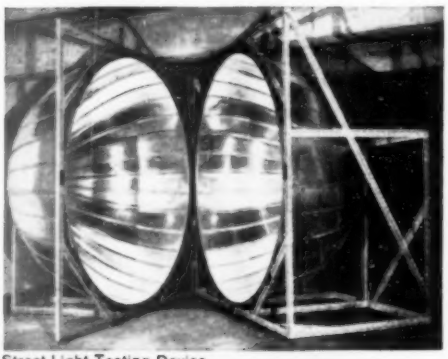


Pallet Racks with Catwalk

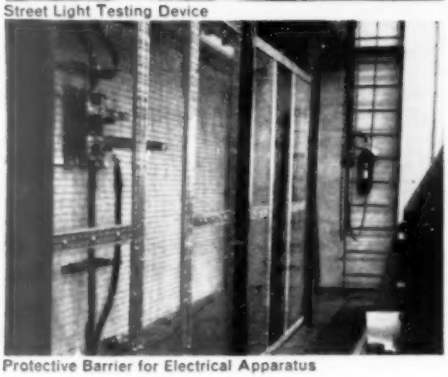
Automobile Display Rack



BUILD IT WITH new AIM BRAND slotted angle



Street Light Testing Device



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Whether you need a common storage frame or an unusual piece of equipment, you can build it faster and more economically with new AIM Brand Slotted Angle. This versatile framing material features a new slot-and-hole bolting pattern that simplifies the assembling of all kinds of durable structures and equipment.

Two bolts fastened through round holes form a Lock-Joint for maximum strength and rigidity. The structural design of mezzanine floors, bar stock racks, etc., permits use of this joint.

Two bolts fastened through slots form a Friction-Joint. This type of joint provides normal rigidity and is used when the structural design of such day-to-day jobs as tables, shelving, etc., permits. ⅜" diameter structural bolts, each with a safe-load capacity of 2000 pounds, are used for all connections.

Cold-rolled galvanized steel, AIM Brand Slotted Angle comes in two sizes: Standard 225-80 (2¼" x 1½" x .080") and Heavy-duty 300-104 (3" x 1½" x .104"). Ten or twelve-foot lengths come in packages of 10 pieces with bolts and nuts.

New AIM Brand Slotted Angle is a product of Acme Steel Company, U. S. pioneers in slotted angle framing material. Available nationally through local distributors or write: Dept. FAD-89, Fabricated Materials Division, Acme Steel Company, 135th Street and Perry Avenue, Chicago 27, Illinois.

ACME STEEL **AIM Brand Slotted Angle** AIM

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DUAL INTAKE VALVES	YES	NO	NO	NO	NO	NO
SMOOTH COPPER TUBING INTER. & AFTERCOOLER	YES	NO	NO	YES	NO	YES
TAPERED CRANKSHAFT FOR FLYWHEEL ATTACHMENT	YES	NO	NO	NO	NO	YES
FOUR PIECE OIL RESERVOIR, CRANKCASE, CYLINDER AND HEAD CONSTRUCTION	YES	NO	NO	NO	NO	NO
THERMAL PROTECTION STD. EQUIPMENT	YES	YES	NO	NO	NO	NO
FOUR PISTON RINGS	YES	YES	NO	YES	NO	YES

Wayne
COMPRESSORS

ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

STORAGE, CONTAINERS

346—Metal Lumber. Complete data and details on slotted metal framing available on request. Republic Steel Corp.

347—Stacking Boxes. Here's full information on design features for varied applications. Republic Steel Corp.

348—Paper Packaging Bags. Free booklet FM-111 describes dozens of ways to cut costs. Union Bag-Camp Paper Corp.

349—Steel Shelving. Catalog gives complete data and features of this flexible steel shelving. Borroughs Mfg. Co.

350—Food Containers. Bulletin lists line of food-handling items for every need. Wear-Ever Aluminum, Inc.

351—Storage Racks. Catalog provides data and applications for adjustable storage racks. American Metal Products Co.

352—Detachable Containers. Free illustrated brochure describes versatile applications for this line. Dempster Bros.

BUILDINGS

353—Roofs. New catalog 8b-Ov has complete data, with description of features of batten roofs. Overly Mfg. Co.

354—Abrasive Tread Plate. Application, design, and fabricating data on non-slip tread plate. Aluminum Co. of America.

355—Roofs. Booklet, "J-M Aquadam Built-Up Roofs," gives complete information on this line. Johns-Manville Corp.

356—Plant Sites. Helpful analysis of industrial potential for locating plants. Bristol Industrial Development Board.

PLANT SERVICES

357—Heat Exchangers, After-Coolers, Condensers. Bulletins 129, 130, 132, 136R are available. Niagara Blower Corp.

358—Lighting. Free booklet: "How to Make Lighting a Better Tool for Profits." Sylvania Lighting Products.

359—Compressors. Catalog C-51 gives complete mechanical data and features on these compressors. The DeVilbiss Co.

360—Steel Lockers. Complete data on design features of lockers finished in baked enamel. Republic Steel Corp.

361—Heat Transfers. New Bulletin P60 gives full data, including performance characteristics. Tranter Mfg., Inc.

362—Pumps. Bulletin 980-D gives complete specification data on these Class "RR" pumps. Buffalo Pumps Div.

363—Pipe, Fittings. Catalog gives detailed information on plastic pipe and fittings. Colonial Plastics Mfg. Co.

364—Compressors. Free Bulletin HAC-40 gives complete data and performance features. Gardner-Denver Co.

MATERIAL HANDLING

365—Cranes. Bulletin C-42 gives full information, with mechanical features and capacities. Harnischfeger Corp.

366—Hoists. Bulletin H-55 shows complete line of balanced-design heavy-lift hoists. Harnischfeger Corp.

367—Fork-Lift Truck. Folder SP-25 describes new fork-lift truck in 2000- to 3000-lb. class. Towmotor Corp.

368—Scales. Bulletin 1157 gives complete information on Printweigh "400" scales. Toledo Scale Div.

369—Fork-Lift Truck. Folder gives data on new truck in 12,000- to 20,000-lb. capacity. Elwell-Parker Electric Co.

370—Lift Trucks. Here's a complete new catalog and price list for 35 new truck models. Crown Controls Co., Inc.

371—Walkie-Type Trucks. Illustrated 16-page booklet contains facts and figures. Automatic Transportation Co.

372—Monorail and Cranes. New booklet: "Cost-Cutting With Monorail and Cranes." Louden Machinery Co.

373—Industrial Tires. Catalog MR-457 describes various features of solid lift-truck tires. Monarch Rubber Co.

374—Wire Rope. Booklet gives complete data on new Double Gray wire rope. Colorado Fuel & Iron Corp.

375—Slings. New sling handbook tells all about types, dimensions, and rated loads. Union Wire Rope Corp.

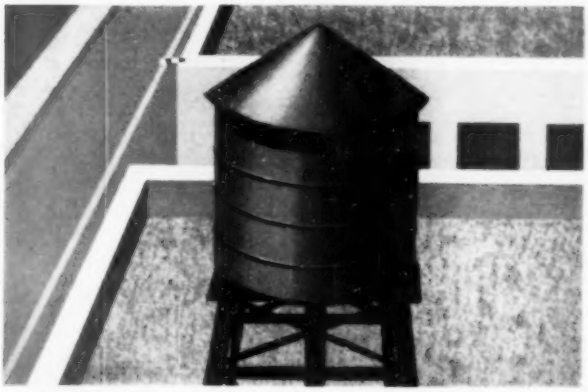
376—Batteries. Catalog GB-1876 gives features of new silconic plate in all batteries. Gould-National Batteries.

377—Conveyors. Bulletin 309 contains complete data on power and gravity conveyors. Standard Conveyor Co.

378—Underhung Cranes. Bulletin has full information, with mechanical features, on these units. Abell-Howe Co.

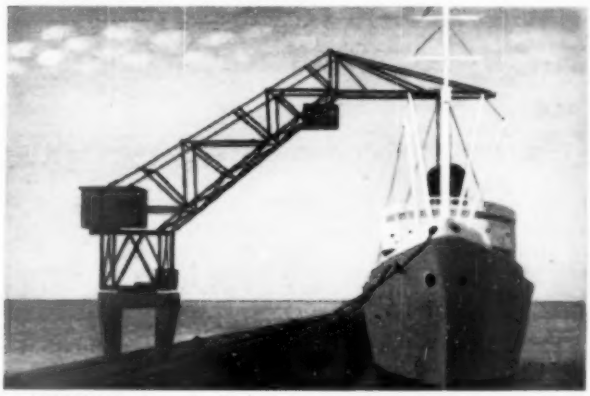
Turn the page

HOW WOULD YOU SOLVE THESE CORROSION PROBLEMS?



1. PROBLEM: Coat inside of factory water tank without affecting taste of the water.

2. PROBLEM: Protect conveyor trestle from the corrosive effects of harmful chemical by-products.



3. PROBLEM: Guard vital parts of a dockside gantry crane from salt spray corrosion.

4. PROBLEM: Coat, while in the field, joints of welded pipe without priming or torching the surface.

JOB-MATCHED COLD COATINGS

PRE-PLANNED... PRE-MIXED... PRE-TESTED

Each Allied Chemical *Job-Matched* Cold Coating (formerly named Barrett) is made to solve specific corrosion problems. When you apply the right control you eliminate costly testing and reapplications. And *Job-Matched* Cold Coatings are inexpensive to begin with!

1. SOLUTION: *Allied Chemical T.O.F.* (#114) Coal-tar material specially compounded for the inside of potable water tanks, pipes, hydrants, hose houses and equipment where no residual taste or odor can be tolerated. Meets AWWA Specification D102-55T, Sec. 5.4.6.

2. SOLUTION: *Allied Chemical CA 50 Coating* (#150) A plasticized, gel-type, coal-tar material that meets U.S. Bureau of Reclamation Specification No. C.A. 50. Protects dams, bridge piers, exposed metal works and concrete subject to extreme corrosion.

3. SOLUTION: *Allied Chemical 34Yc Coating* (#134) A plasticized thixo-tropic, coal-tar material meeting the U.S. Navy, Bureau of Yards and Docks Specification No. 34Yc. Combats corrosion due to salt spray and other reactive conditions—piers, ships, service vessels and offshore installations.

4. SOLUTION: *Allied Chemical Service Cement* (#160) A mastic type coating with high-grade, coal-tar pitch base, plastic material. You don't have to prime for torch field welding. Use it with our Pipeline Fabric. Meets Specification SSC-153, Type II.

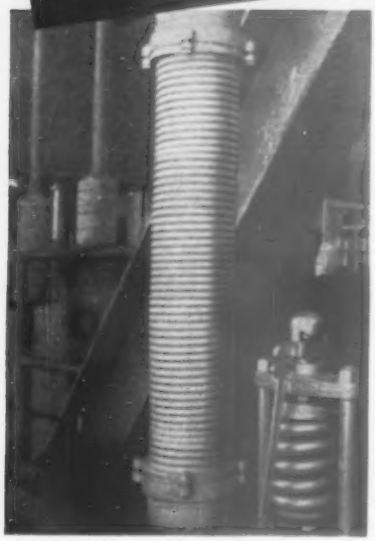
You name the area and there's a *Job-Matched* Cold Coating ready to be brushed or sprayed on without heating or activators. Properties include chemical resistance, heavy coating thickness per coat and fast drying.

PLASTICS AND COAL CHEMICALS DIVISION
40 Rector Street, New York 6, N. Y.

Allied Chemical

PENFLEX

• CUSHIONS SHOCK
• PREVENTS BREAKS



PENFLEX TUBING ABSORBS THERMAL EXPANSION SHOCKS

Thermal expansion 900°F . . . pressures up to 850 psi. . . . impact and pipe movement under terrific strain, but Penflex safely handles them all. That's the story of Penflex 8" I.D. stainless steel interlocked tubing welded into the pipeline, eliminating the cost of flanging the joint as well as the pipe. This was installed as an expansion joint on safety blow-off valves.

Wherever thermal expansion, pressures and shock are factors in keeping steam, air, water or chemical lines from breaking you can rely on Penflex Interlocked Tubing and Penflexweld High Pressure Tubing. Available in steel, bronze and stainless steel from ⅛" I.D. to 24" I.D. Write for complete details to Pennsylvania Flexible Metallic Tubing Company, Inc., 7241 Powers Lane, Philadelphia 42, Pa.

GET NEW DATA BOOK AND CATALOG

PENFLEX

TIGHT AS A PIPE BUT...
FLEXIBLE

ADVERTISERS' LITERATURE

Begins on page 222

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

379—Electric Hoist. Catalog on complete line of hoists: ⅛ to 2 tons, 8 to 60 fpm. Chisholm-Moore Hoist Div.

380—Industrial Locomotives. Useful literature describes and illustrates maker's line. Rogers Brothers Corp.

ELECTRICAL

381—A-C Motors. Bulletin 1797 illustrates and describes line of vari-drive motors. U.S. Electrical Motors.

382—Motors. Bulletin 270A supplies full data on line of motors for varied applications. Century Electric Co.

383—D-C Motors. Information on new totally enclosed motors, 10 to 200 hp. Reliance Electric & Engineering Co.

384—A-C Motors. Bulletin GEA-6865 has complete information on new custom "8000" line. General Electric Co.

MAINTENANCE

385—Lubrication Equipment. Free catalog lists complete line, electric and air-powered. Alemite Div., S-W Corp.

386—Dust Collectors. Illustrated literature on single machine types. Choose from 46 models. Aget Mfg. Co.

387—Lubricants. Booklet, "Management Practices That Control Costs via Organized Lubrication." Texaco, Inc.

388—Floor Maintenance. Booklet (32 pages), "Proper Care Of Floors," free upon request. West Chemical Products.

389—Visible Record Systems. Literature describes use for preventive maintenance programs. Acme Visible Records.

390—Mortar. New 20-page brochure describes properties for repairing tile walls. Standard Dry Wall Products, Inc.

391—Lubricants. Free "Lubriplate Data Book" is a valuable treatise on lubrication. Lubriplate Div., Fiske Bros.

PRODUCTION

392—Schedule Board. Bulletin X-400 shows application of visual control schedule board. Graphic Systems.

393—Shears. Catalog 2011 has construction, engineering data. Steelweld Div., Cleveland Crane & Engineering Co.

Turn the page

"Slickest visual control..."

states *Factory* magazine. Entries made directly with marking pencil on a rolling "Mylar" sleeve which *moves with time*, bringing deadlines constantly closer. Entries easily erased with the swish of a cloth.

Send for **FREE GUIDE to Control Methods**
with full-scale, sample chart section

Shows how Rol-a-chart controls 22 different items: orders, production, data processing, maintenance, dispatching, sales, etc. Also expert consultation service with no obligation.

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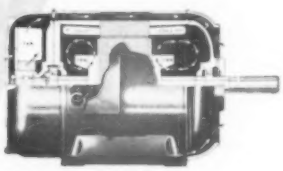
Circle 594 on Reader Service Card

FOR PROVEN ECONOMICAL **POWER**

AIR COOLED

Custom Built . . .
NOT Custom Priced



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BALL BEARING MOTOR

Here's real power, custom built to fit your every requirement. Totally enclosed — fan cooled — polyphase 50 or 60 cycles — constant speed — squirrel cage induction — high torque — low starting current — enclosed ball bearing.

Send for complete details Today.

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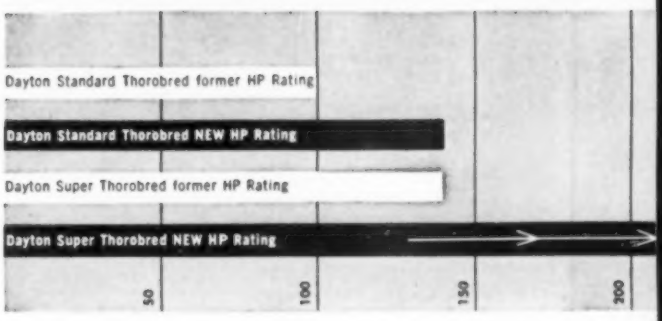
New HP Ratings on Dayton Cog-Belts® provide important savings in Drive Space, Weight and Cost

Dayton Cog-Belt Horsepower Capacity increased to 200-300% of previous Standard Belt Ratings . . . using existing industry-standard sheaves

- Two Cog-Belts do the work of as many as 6 previous standard V-Belts.
- No special sheaves required . . . use existing sheave stocks on Cog-Belt drives.
- Job-proven Dayton quality is backed by the experience of many actual drive applications throughout industry.
- New ratings approved only after proven by most rigorous research standards.
- Your present sheave inventories cover a much greater range of horsepower capacities.
- Less belts per drive mean less drive space, less drive weight.



Thorobred and Super-Thorobred V-Belts also newly rated

- New Thorobred ratings are now 140% of previous standard belt ratings.
- New Super-Thorobred ratings are now 170-220% of previous standard belt ratings.

Write for new brochure showing how designers can calculate Dayton Cog-Belt drives by referring to existing drive selection tables in Dayton's #280-B Handbook of V-Belt Drive Design. See "Belting" in the yellow pages of your telephone directory for the name of your nearest Dayton Distributor, or write Dayton Industrial Products Company, Division of The Dayton Rubber Company, Melrose Park, Ill.

Utilize over 30 years of time proven Dayton quality, research and engineering in your V-Belt drive design.

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Dayton Industrial Products Co.

Melrose Park, Ill.

A Division of The Dayton Rubber Company

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The key to today's manufacturing problems...

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For higher output, lower costs, peak efficiency — Handbook is the key to the management-engineering methods that are revolutionizing industrial production today. New materials, machines, processes, and functioning of company organization—all are reflected in this Handbook's 1,700 pages of practical production know-how.

The only fully integrated guide to modern manufacturing, this volume puts at your fingertips proved principles, time- and work-saving systems, and successful operating procedures *for each phase of modern production activity.*

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● **Simplified analytical methods** help cut through the calculations and paperwork attendant on complex manufacturing processes. New approaches and techniques help to save hundreds of hours in completing work and time studies, isolating costs, interpreting research. From the world's cumulative literature of production the Handbook organizes the knowledge of experts, adaptable for use in companies of every size and type.

25 AUTHORITATIVE SECTIONS!

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ADVERTISERS' LITERATURE

Begins on page 222

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

394—Air Tools. Bulletins give complete information and features of hand-held air tools. Gardner-Denver Co.

395—Flexible Tubing. Data book and catalog on stainless-steel interlocked, welded type. Penna. Flexible Tubing Co.

396—Electric Hammers. Literature gives full information and varied applications. Black & Decker Mfg. Co.

397—Hydraulic Oils. Free literature describes properties and applications of hydraulic oils. Sinclair Refining Co.

398—Chain Drives. Book 2425 (88 pages) gives helpful data and features of silent chain drives. Link-Belt Co.

399—Couplings. New Bulletin 4100 gives complete mechanical data, features, and applications. The Falk Corp.

Your Best Bargains...

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A176—Better Make-Buy Decisions
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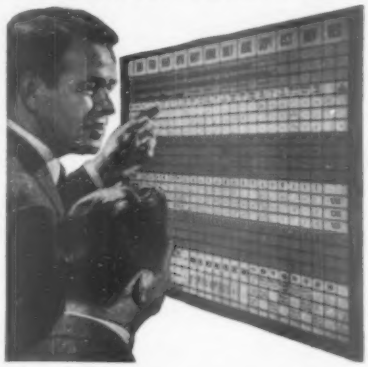
A101—Organizing for Cost Reduction
A103—How to Find—and Plug—Your Profit Leaks
A152—How to Make Today's Production Controls Cut Costs
A154—Modernizing to Beat Competition
A197—Cost Control—Past, Present, and Future

You Get Things Done With Boardmaster Visual Control



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REMEMBER

PALMETTO Packings pack more performance into every application

GET THEM at any industrial distributor authorized to carry Palmetto Packings . . . For the name of a supply house near you consult our insert in Thomas Register—between pages 4816-4817.

GREENE, TWEED & CO.
North Wales • Pennsylvania

Circle 599 on Reader Service Card

CONTROL Costly Eye Accidents...

WITH INEXPENSIVE Safety Glasses Like These

When you give your employees American Optical safety glasses such as our Ultrascopic line, you obtain results! One user reports savings as follows:

1 Lost production time and medical costs *down* from $5.17 per year per employee to $ .56.

2 Lost production time per employee per year *down* from 1.67 hours to 1/10th of an hour.

3 Lost production hours in dollars *down* from $3.36 per employee to $ .23.

Ask your Safety Director about these safety glasses. He knows there is no substitute for quality in safety! Your nearest AO Safety Products Representative can supply you.

AO SAFETY GLASSES LOOK GOOD ON THE WORKER — AND THE SAVINGS LOOK GOOD ON YOUR BOOKS!

Always insist on the AO Trademark on lenses and frames.

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Ask your Safety Director about these safety glasses. He knows there is no substitute for quality in safety! Your nearest AO Safety Products Representative can supply you.

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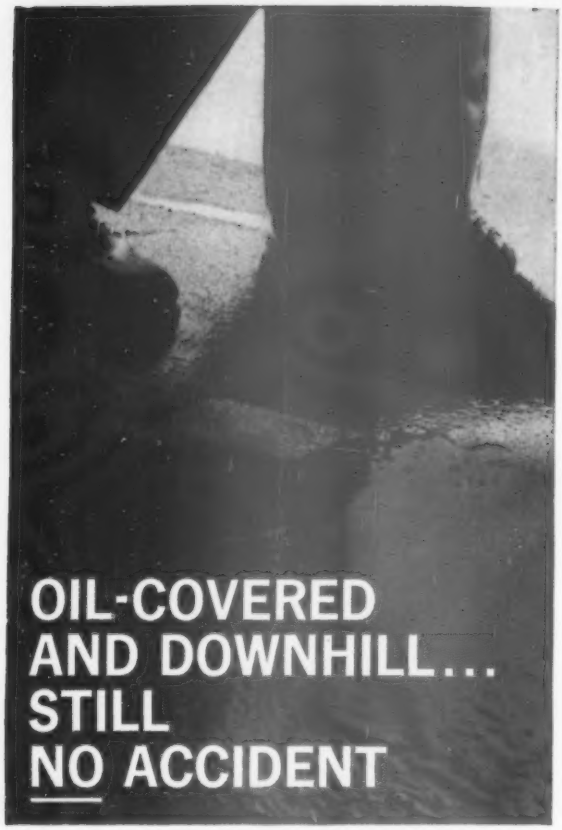

OIL-COVERED AND DOWNHILL... STILL NO ACCIDENT

Get Lasting Protection Against Slipping with Alcoa Abrasive Tread Plate

Disaster no longer lurks on the oil-splattered floor of this vital production area. Alcoa® Aluminum Abrasive Tread Plate makes sure it never gets a chance to strike—no matter how wet, oily or greasy the floor becomes. Made with tough particles of fused aluminum oxide, its hard, abrasive surface offers complete slip-proof protection. Lighter weight makes it easier to install. Corrosion resistance means virtually no maintenance. Longer, safer protection is assured, because wear serves only to renew the surface by uncovering embedded abrasive particles.

Protect skilled workers and avoid costly production breakdowns by installing Alcoa Abrasive Tread Plate in areas where slippery materials accumulate. For more information check the coupon below, write Aluminum Company of America, 1687-H Alcoa Building, Pittsburgh 19, Pa., or call your nearest Alcoa Distributor.

ALCOA ALUMINUM

Your Guide to the Best in Aluminum Value

For Exciting Drama Watch "Alcoa Theatre," Alternate Mondays, NBC-TV, and "Alcoa Presents," Every Tuesday, ABC-TV

Aluminum Company of America
1687-H Alcoa Building, Pittsburgh 19, Pa.

Show me how Alcoa Abrasive Tread Plate prevents slipping.
Please send a FREE sample—also application, design and fabricating data

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Address_____

City and State_____

228 **For more facts Circle 601 on Reader Service Card**

PERSONNEL MANAGERS

LOOKING FOR EXPERIENCED ENGINEERS... TECHNICAL PERSONNEL?

Write for a free copy of:

"How You Can Reach The Experienced Engineer..."

The top-flight engineers and technical personnel you want are at a premium . . . as this twelve page booklet points out. How you can reach and influence these men is the story told.

The booklet tells where to find the experienced engineer. It explains how you can make contact . . . channel and concentrate your employment advertising to just the men with the job qualifications you want. Included are testimonials from personnel men who use technical publications successfully . . . sample advertisements that got results . . . helpful hints to consider and pitfalls to avoid when you prepare your copy and layout for an Employment Opportunity advertisement.

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Mr. Thomas Bender, ***Classified Advertising Division***
McGRAW-HILL PUBLISHING COMPANY, INC.
P.O. Box 12 **New York 36, New York**

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Sweep concrete, asphalt, wood floors FAST

Parker
FLOOR SWEEPERS
TURBO-SWEEP "40"
• Sweeps 50,000 sq. ft. per hour
• Completely self-propelled
• Collects dirt, trash, paper, scrap . . . all debris
• Dust bag and trash hopper emptied in seconds
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TURBO
SWEEP

MANUAL . . . Easy to maneuver around boxes, crates, in aisles. 20" and 28".

MOTORIZED . . . Quick, efficient cleaning for large areas. 20" and 28".

MAIL NOW!

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Springfield, Ohio

Send me free booklet and give me money-saving facts!

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Company_____

Address_____

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For more facts Circle 602 on Reader Service Card

FIRST completely static protective relay!

...Available in Allis-Chalmers switchgear

This highly reliable *new* protective overcurrent relay has no moving parts . . . it's static, and it's only ⅓ the size of conventional relays.

Employing transistors, printed circuits, and other electronic components encased in epoxy-resin, A-C static relays are shock and moisture resistant. They're unaffected by temperature changes, operate with low burden, and have instantaneous reset feature. Quick plug-in construction makes replacement easy.

Want more protective relay-equipped switchgear facts? Contact your nearby A-C office or Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

A-C Introduces New Static Relay

COLLEGE STATION, Texas, April 13 — Over 300 relay engineers and scientists witnessed another example of the Electronic Age today when Allis-Chalmers introduced a new static protective relay. The new development was disclosed in an engineering paper presented by John Baude, Allis-Chalmers engineer, before the Twelfth Annual Conference for Protective Relay Engineers.

PARTS

Small size saves panel space.

ALLIS-CHALMERS

A-1157-GI

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DULL, DAMP OR DAMAGED WALLS

With

SWIFT'S ADCOTE ADHESIVE FINISH

Not a Plaster or Paint... Adcote is a new concept in industrial wall finishes

Adcote, the result of Swift's years of research and practical application, may well be the answer to your most perplexing surface finishing problem. Take advantage of Swift's vast experience with adhesive products . . . consider how these Adcote characteristics will help you.

Characteristics of Adcote:

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☐ Send descriptive bulletin
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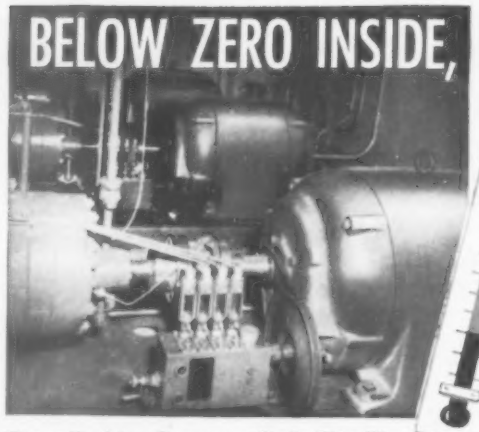

refrigeration dependably powered by BROOK MOTORS

Evans Packing Company, Dade City, Fla., uses Brook Motors for refrigeration throughout their plant—one of the finest in the industry. Three of seven Brook Motors are shown on vital refrigerant compressors used in freezing and storage of concentrated citrus juices—shut-downs cannot be tolerated—an ideal spot for Brook Motors. There are no finer motors built, yet they cost less than ordinary motors. Dealers and Service Centers everywhere. Send for literature.

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"world's most respected motor"

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3302 W. Peterson Ave., Chicago 45, Illinois

In Canada: Brook Electric Motors of Canada, Ltd. 250 University Ave., Toronto.

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For more facts Circle 605 on Reader Service Card

NOW— Portable, Plug-In High Pressure STEAM-JET CLEANING

Steam at the flick of a switch—on 115 or 230-volt circuits! Precision-built—instrument quality. Accessories include steam hose, high pressure nozzle and rubber-tired cart—all easily attached.

THE SPEEDYLECTRIC SERIES "R" STEAM GENERATOR

★ Pressures up to 250 psi to 407° F.

★ Midget-size generator, steamer or cleaner.

Write for Bulletin SG-200

Pantex MANUFACTURING CORPORATION

Box 660 AW, Pawtucket, R. I.

9-298

For more facts Circle 606 on Reader Service Card

Circle 604 on Reader Service Card

For ABSORBENCY...get NIBROC Hi-Dry Towels
Exclusive Hi-Dry fibres soak up water in a flash ▫ They're packed with drying power ▫ Will not come apart in your hands ▫ The big pay-off: Minimum waste ▫ Rock-bottom annual towel costs ▫ Next time get Nibroc Hi-Dry Towels.
Another Quality Product of BROWN COMPANY
QUALITY
Mills: Berlin and Gorham, N. H.
General Sales Offices: 150 Causeway Street, Boston 14, Mass.
See "Paper Towels" in Yellow Pages, or write Dept. 00, Boston, for samples.

"And that's why I buy Nibroc Hi-Dry Towels"

YOU TOO WILL FIND NIBROC the savingest towels ever. Mail the coupon today for a Customer Service set of 8 Washroom Posters that will help you cut towel consumption—reduce maintenance. Check also for samples, complete information and name of your nearest Nibroc dealer.

BROWN COMPANY NC-8
Towel Sales Division
150 Causeway St., Boston 14, Mass.
☐ Send me set of Posters
☐ Send samples and complete information

Name _____ *Title* _____
Firm _____
Street _____
City _____ *Zone* _____ *State* _____

This is a foreman dressing for work!

Time was when Pete wore the grubbiest work clothes he could find. He *had* to—with all the trouble-shooting he did. And as production fell behind he sometimes even had to fill in on a machine. What a waste of a good foreman!

Today, you'll find Pete in a white shirt—and tie. No longer does he do other men's work. Now he's the real right hand his management needs and wants.

Automatic Keysort Data Processing made the difference! Automatic Keysort now helps Pete and his management plan *in advance*, reports performance at every stage. Man-hours are used more profitably... and experienced foremen like Pete are free to concentrate on supervision, work assignments, production flow. Without extra bookkeeping, without having to pitch in themselves.

Automatic Keysort's easy-to-use machines and punched cards require no specialized personnel, no restrictive procedures. Designed to fit your business as it stands and as it grows, Keysort will give you all the fast, accurate information you need for modern management control of every factory operation. And at remarkably low cost.

To learn more about how Automatic Keysort Data Processing can fulfill *your* needs for timely, comprehensive facts and figures, call your nearby Royal McBee Data Processing Representative, or write Royal McBee Corporation, Data Processing Division, Port Chester, N. Y., for brochure FS-33.

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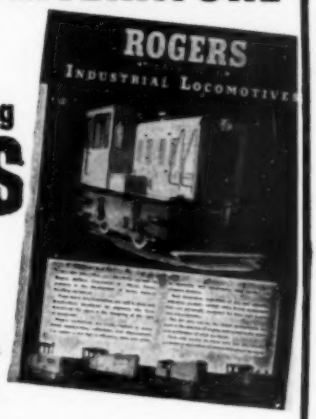

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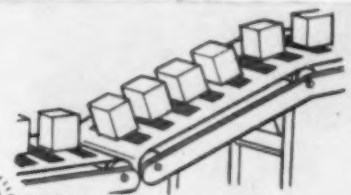

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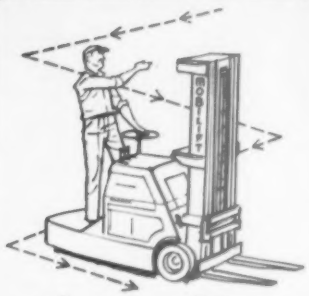

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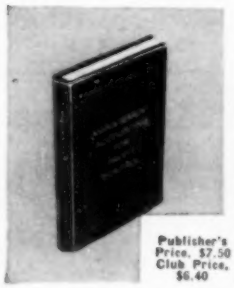

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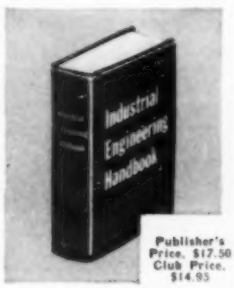

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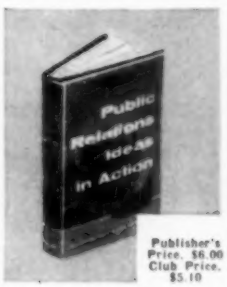

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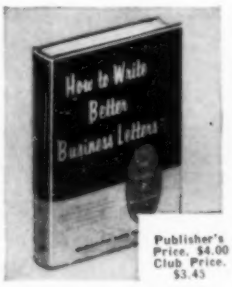

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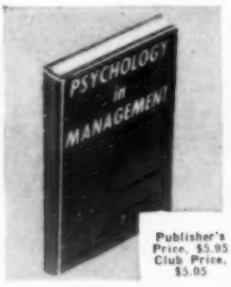

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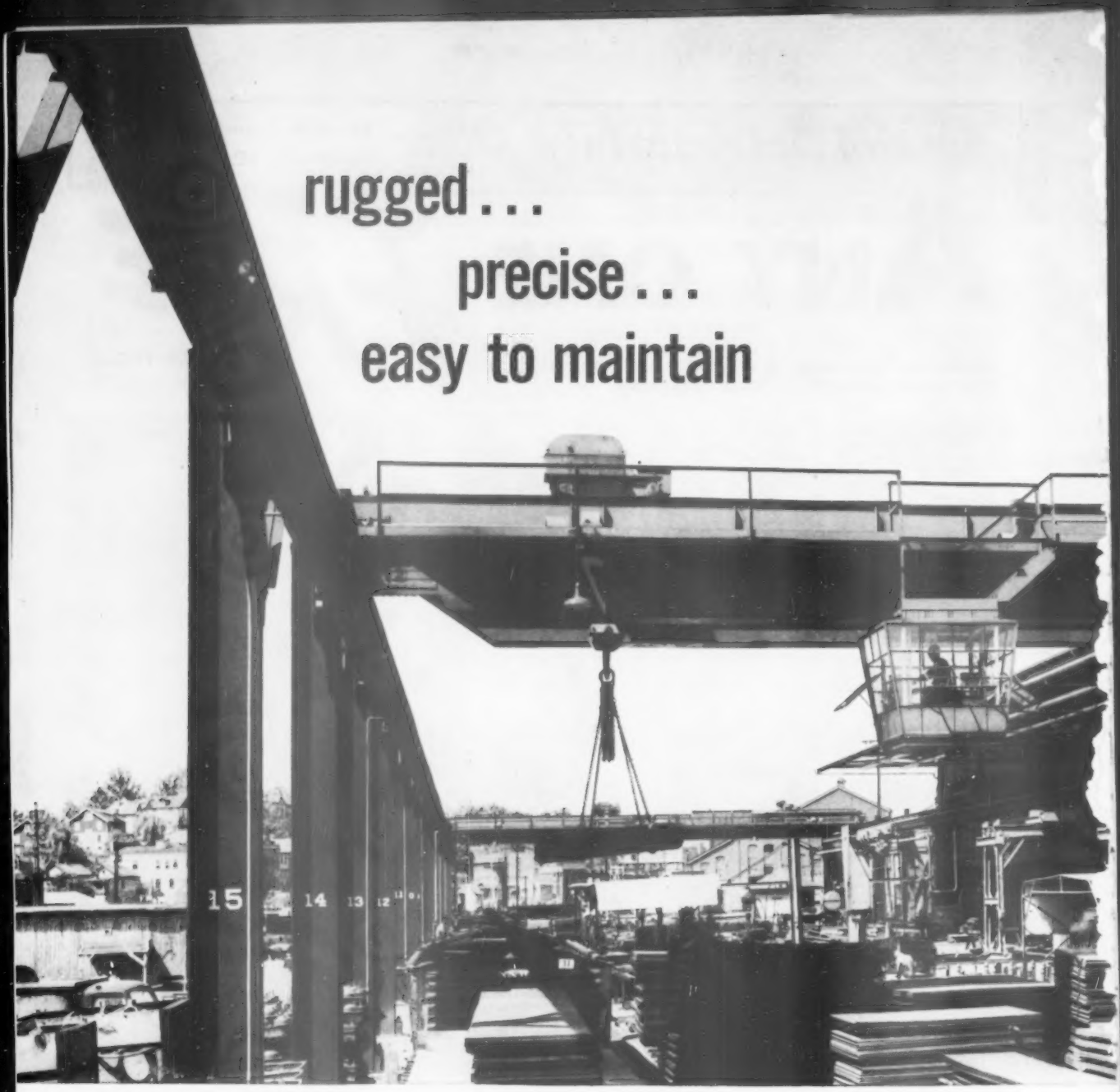

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Catalogs in This Issue

To help you, here is a list of catalogs described in this issue. To obtain, circle key numbers on either postcard.

MAINTENANCE
1—Refractory Cements
2—Heat Exchangers
3—Aridifier
4—Water Treating Equipment
5—Clamps and Brackets
6—Welding System
7—Service Vehicles
8—Electric Process Heaters
9—Mechanical Tools
10—Centralized Lubrication

AUXILIARY
11—Magnetic Brakes
12—Air Starting Motors
13—Field Compressors
14—Condensation Pumps
15—Waste Treatment Equipment
16—Compressors

ELECTRICAL
17—Telephone Planning
18—Limit Switches
19—Lighting Units
20—Electric Motors
21—Dielectric Test Set
22—Switches
23—Voltage Regulators

MATERIAL HANDLING
24—Storage Racks
25—Packaging Product
26—Electric Hoists
27—Trucks
28—Conveyors
29—Plate Magnets
30—Cranes
31—Trucks
32—Silent Hoist Crane
33—Fork Trucks
34—Vacuum Sheet Lifters

VALVES AND FITTINGS
35—Butterfly Valves
36—Fittings and Flanges
37—Nozzle Valves
38—Coated Valves
39—Relief Valves

PRODUCTION
40—Finishing Equipment
41—Counters
42—Taps
43—Ferrous Metal Flaw Detector
44—Gas Welding Equipment
45—Power Saw
46—Chucking Systems
47—Spot and Projection Welders
48—Machine Tools
49—Weighing Systems

BUILDING
50—Metal Windows
51—Luminous Ceilings
52—Doors
53—Dust and Fume Control

MECHANICAL
54—Power Transmission Machinery
55—Sprockets, Roller Chains
56—Roller Bearings
57—Poly-V "J" Drive
58—Roller Bearings
59—Skew-Axis Gears
60—Indexing Mechanisms

INSTRUMENTS AND CONTROLS
61—Recording Systems
62—Recorders, Controllers
63—Recording Device
64—Signaling Controller

...in other words—I want safety switches with VISIBLE BLADES!

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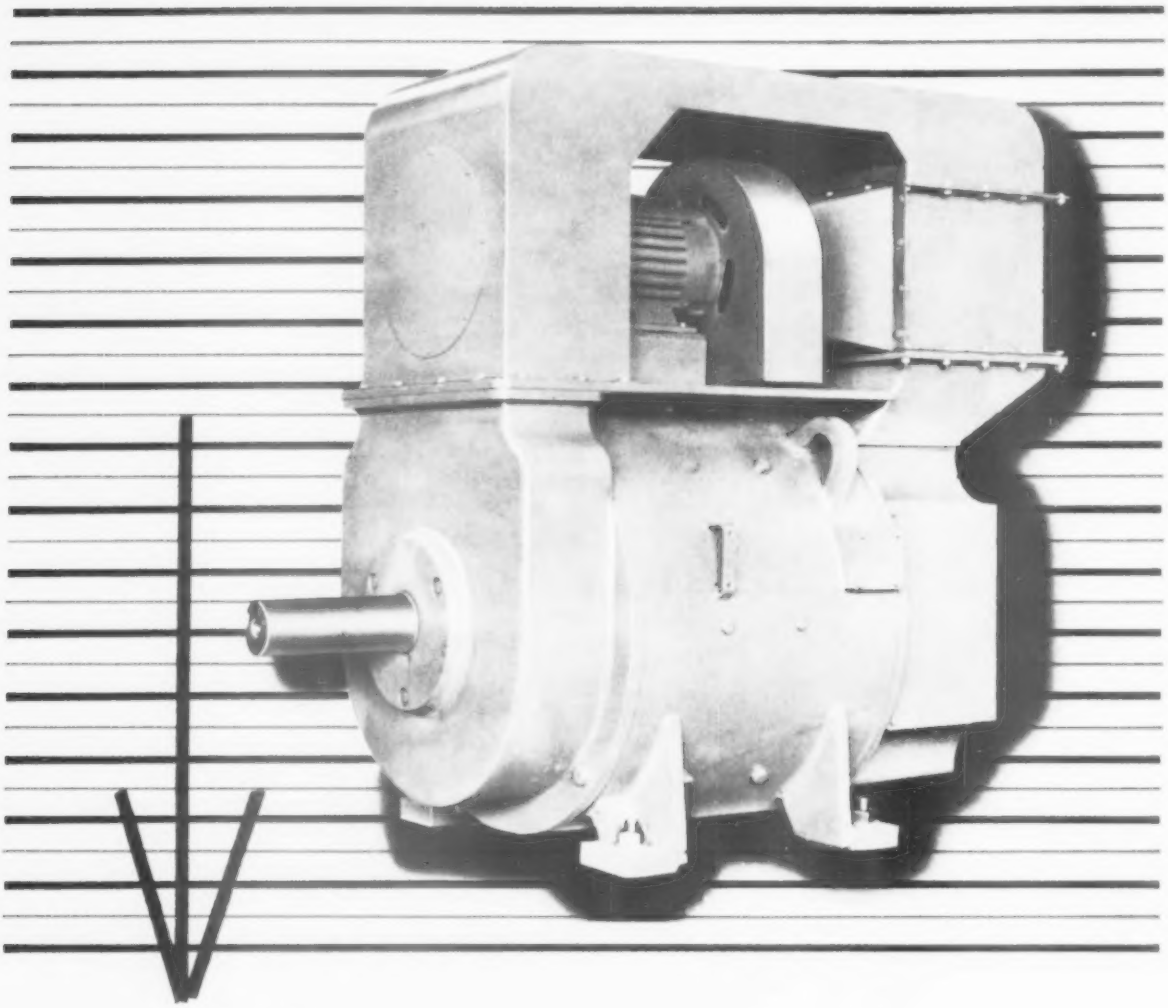

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